EPA Comments Draft Final East Waterway Feasibility Study dated October 2016.

Comment #	Section #	Page #	Comment
1	General		All references to Sediment Reduction Zones (SRZs) need to be removed from the document. EPA understands SRZs to be a temporary administrative component of MTCA/SMS and therefore it is not applicable to CERCLA sites.
2	General		Because a specific value has not yet been established for natural background, it is impossible to know if such a future value will be able to be met. Remove all language that implies the expectation of meeting regional background, or links regional background with achievement of RAOs/ARARs.
3	General		The FS does not discuss what assumption was made about the status of the Lower Duwamish Waterway (LDW) cleanup. During modeling, assumptions had to be made regarding potential contamination coming from LDW sediment which would be dictated by whether or not the LDW was pre- or post-construction. EWG relayed during the Dec. 16, 2014 meeting with EPA, that overall the FS assumed post-LDW cleanup. The text must make this clear in the executive summary and other key locations, along with specifics incorporated with the model that align with this assumption.
4	General		Discussion of compliance with ARARs needs to be modified for consistency to what is shown below in order to conform to EPA policy. All references to sediment remediation zones (consistent with Comment #1) and the expectation of meeting regional background levels (consistent with Comment #2) must be removed. The following language changes need to be incorporated throughout the FS, in particular to Chapter 9 in sections 9.X.2 for the discussion of each alternative. This example was taken from the first paragraph of Section 9.6.2 for Alt 1B(12), but the same changes need to be made in other sections as well. "Alternative 1B(12) is expected to comply with MTCA/SMS for protectiveness of human health for direct contact (RAO 2), protection of the benthic community (RAO 3), and protection of higher trophic level organisms (RAO 4) by achieving the PRGs for these RAOs, but it has the same ARAR compliance limitations for protection of human health for seafood consumption (RAO 1) as Alternative 1A(12) (see Section 9.5.2). Alternative 1B(12) is not likely to meet all natural background-based PRGs. Although the SMS allows for use of a regional background-based cleanup level if it is not technically practicable to achieve natural background levels, regional background levels have not yet been~~, but following source control and remediation efforts, it is expected to comply with MTCA/SMS requirements in the long term once regional background levels are~~ established for the geographic area of the EW~~. and cleanup levels are adjusted upward. If monitoring demonstrates that cleanup levels are not achieved, compliance with MTCA/SMS can be attained through the establishment of SRZs and compliance with the requirements of WAC 173-204-590 (see Appendix A).~~ In addition, surface water quality is expected to improve, yet it may not comply with human health surface water quality standards for total PCBs and arsenic."
5	General		The modeling used to estimate sediment deposition and expected chemical concentration appears to be based partially on assumptions made in 2010 about the Green River's influence on the LDW. Since then, actual data has been acquired and continues to be collected about suspended solids, bed concentrations, and other parameters. It is apparent, that based upon the data, the original estimations made about the influence of chemical recontamination from the Green River on the LDW are too high. More discussion is needed between the EWG and EPA regarding additional modeling and calibration of the models based on recent data, rather than old assumptions. EWG needs to provide narrative describing what newer data has been collected since the draft FS was prepared, and how it could influence modeling results.
6	General		Make sure that "1,4-dichlorobenzene" is written with a hyphen; it is not consistent throughout the FS.
7	General		The construction window presented in the FS is Oct 1 - Feb 15. a) Based on discussions with EWG, it appears this timeframe is based on the fish window (which allows construction July 16 - Feb 15), plus an allowance for tribal fishing (which reduces the construction window to Oct 1 - Feb 15). Based on EPA's experience, construction between July 16 and Oct 1 (the tribal fishing allowance) is possible with coordination from the Tribes. Because much of the FS alternatives analysis hinges on the years of construction (which is dictated by the length of the construction window), the FS needs to be based upon the formal fish window of July 16 - Feb 15. . b) Based on this extended construction window, update data and calculations that are influenced by the length of the construction window (e.g. years of construction, cost, etc.).

Comment #	Section #	Page #	Comment
8	General		Throughout the FS when discussing cPAHs, some of the time it is noted as “cPAHs TEQ” and sometimes just “cPAHs”. Be more consistent (particularly in tables) with which is being used.
9	General		This comment addresses RAO 2 for arsenic. Table 9-2 shows all action alternatives achieve the arsenic PRG at year 0 (end of construction) and some continue to meet into year 5; however, no alternative meets the PRG following year 5. In addition, Table 9-6a shows that excess cancer risk for arsenic does not meet the 10^{-6} risk threshold. (It is noted that Table 9-6b does show achievement of the 10^{-5} total excess cancer risk threshold for arsenic and cPAHs combined). Throughout the FS, the description of achievement of RAOs and ARARs is inconsistent with this information shown in Chapter 9. The following are a few examples. Revise the language to reflect the data presented. 1) In Table 10-1 for Magnitude and Type of Residual Risk for RAO 2, it is described "For arsenic, action alternatives are predicted to meet the PRG following construction and may meet PRGs in the longer term depending on incoming Green River concentrations." It needs to be clarified that, i) the current model shows arsenic SWACs are <u>not</u> expected to meet the PRGs in the long term because of predicted incoming Green River concentrations, however, ii) given the model uncertainty, the actual incoming concentrations may be less than currently predicted which may result in achievement of the PRG. 2) In Table 10-1 for Compliance with ARARs, it is described that "All action alternatives are expected to achieve PRGs or 1 x 10^{-6} cancer risk threshold immediately after construction..." At year 0 this is largely true, but does not continue to be true afterward. It needs to be clearly stated that ARARs are expected to be met at year 0, but according to EPA, are not expected to be met in following years. 3) In Table 10-1 for Time to Achieve RAOs, the timeframe indicated to achieve RAO 2 for arsenic is at end of construction (when the PRGs/risk is initially achieved). But since the PRGs and risk do not continue to be achieved in subsequent years, the timeframes must reflect this. This could be done with a footnote/asterisk stating that the time shown is for initial achievement of RAOs, but that achievement is not expected to continue past year X based on modeling.
10	General		The FS needs to further discuss how the EW remediation efforts are compatible with the Seattle Harbor Navigation Improvement Project (SHNIP). This deepening project is considered a reasonable future use for EW and therefore needs to be included in more detail in the FS. Details of the SNHIP project can be found in the “SHNIP Draft Integrated Feasibility Report and Environmental Assessment” dated August 2016. a) It must be explicitly stated that SHNIP is an anticipated future land use. Section 2.9.2 is an appropriate place for this. b) In the FS, describe how the alternatives and technologies chosen are compatible with the future deepening project. Based on the analysis in Appendix H, provide a summary with figures showing cores that remain above RAL/SQS or CLS following remedial action and may be impacted by SHNIP, and to what depth this impact may occur. (As a suggestion, either Chapter 9 or Appendix H seem like appropriate locations for this). c) In the FS, provide a summary noting how future dredging is anticipated to impact completed remediation work involving material placement (e.g., capping, backfilling, ENR, and RMC). (As a suggestion, Chapter 7 seems like an appropriate location for this). It is noted that USACE previously provided guidance to EPA and the Lower Duwamish Waterway Group (LDWG) as to dredging buffers that were expected to be compatible with the future use of the LDW (letter to Ms. Allison Hiltner at EPA from Mr. Stuart Cook at USACE, dated Aug. 3, 2010). EPA expects that similar buffers will be implemented in EW. This includes a 4 ft vertical cap buffer and a 10 ft horizontal cap buffer (distances between any capping and the anticipated authorized depth/width). The same buffers need to also be considered for ENR areas. d) The FS needs to discuss, qualitatively, how mixing modeling results would be influenced by the effects of the deepening project. During meetings, EWG has indicated that the deeper mixing expected from larger ships (i.e. larger propwash) is likely to lead to lower SWAC concentrations; this is a key item that must be discussed in more detail. In addition, the FS must discuss any new or different propwash impacts to contamination left behind (Appendix H) and describe how potential additional mixing of underpier hot-spot

Comment #	Section #	Page #	Comment
			areas would be expected to affect mixing model results. EPA is NOT requiring that additional modeling be performed, but that a qualitative discussion be presented and a statement be added indicating that impacts from deepening will be addressed during remedial design.
11	General		Add language that there will be meaningful input on project modifications, contingency/adaptive management issues, waivers, ROD amendments etc.
12	General		Capping should not be used in areas that would require the use of armoring to prevent scour. If scour protection is considered then mitigation of lost habitat needs to be added to the cost estimate.
13	ES	1	The executive summary discussion moves into remedial alternatives without firmly identifying potential exposure pathways (i.e., clamming areas, surface sediment, and subsurface sediments) in "Contaminant Risks" Section. Add a discussion of exposure pathways in the ES.
14	ES	1	2nd paragraph: These tides represent the extremes; values need to also be presented for average tides.
15	ES	1	3rd bullet: This discussion must explain that sediment contamination is the focus, supporting next section (Contaminants of Concern) declaration that primary COCs are in sediment.
16	ES	1	Footnote 2: Add that given the short time spent in the EW by salmon, they are not expected to acquire a significant contaminant body burden from contaminants found in EW sediments.
17	ES	3	Combined dredging/capping alternatives to maintain bed elevations are commonplace and need to be mentioned here and are acceptable where navigation depths must be maintained. ENR/MNR/in situ treatment approaches do not maintain bed elevations, but may be acceptable where navigation is not of concern (i.e., under piers, clamming areas).
18	ES; Figure 2	3	Figure 2 must show the complete process and indicate by highlight that the EW is currently in the FS stage.
19	ES	4	5th bullet: State what the natural recovery process does, i.e., eliminates chemical exposure so that the benthic community can repopulate the remediation area.
20	ES	4	Definition of SWAC: Spatial weighting is a technique that can be used to correct for the influence of variable sampling density over an area of interest. Spatial weighting is done using a multiplicative relationship between the area of a sample result and the chemical concentration at that location. In densely sampled areas, the area a sample represents is small. In lower density sampling areas, the area a sample represents is large. Thus, spatial weighting reduces the significance of sample results in areas that are densely sampled and increases the significance of sample results in areas that are less densely sampled. Usually, higher density sampling occurs in areas with higher levels of contamination. Failure to utilize spatial weighting would result in estimation of average concentrations that are likely greater than the true average chemical concentrations. Add this information to the text in this section.
21	ES	4	In the definition of SMS, include a description of how SMS relates to SQSs and CSLs.
22	ES; Figure 3	5	The figure is not referenced in the text. Add the reference.
23	ES	5	Commercial and Navigation Activities: Tribal netfishery is a future use but not shown on the figure. Add to the figure.
24	ES	5	Commercial and Navigation Activities: Indicate what the authorization depth is (are), and why there are subarea boundaries within the channel.
25	ES	5	Commercial and Navigation Activities: Many terminals and slips are shown on the figure but their existence and purpose is not mentioned in the text. Add this information to the text.
26	ES	5	Habitat: The 2014 Supplemental RI says wildlife are not abundant/important in EW, but the text here states that EW provides habitat important to various species. This is a contradiction. Clarify and explain if there are any marine mammals occupying the study area.
27	ES	5	Habitat: State what type of habitat exists that supports salmon/bull trout, and where this is located on the figure.
28	ES	6	In the first bullet, further define "hot-spot" in text, and reference Figure 4. While there may/not be active source areas, there are noted areas >1800 ug/kg in the EW sediments which appear to be statistically significant (i.e., > 95th percentile).
29	ES	6	The second bullet does not specifically state that the SWAC includes only surface sediment data from the BAZ. Reference footnote 3 here.
30	ES	6	In the fourth bullet, provide 95th percentile for depths of sediments exceeding the SQS, as done previously for surface sediments.

Comment #	Section #	Page #	Comment
31	ES	6	Also note that there is concern about subsurface contamination that might enter the biologically active zone due to scour or other mechanisms.
32	ES; Figure 5	7	Clarify the figure title by adding “marine” before “Benthic”. The text describes SMS as applicable to marine benthic criteria.
33	ES	8	Cover Photo: The photo implies hook and line fishing is a significant exposure pathway yet the text describes only net fishing and clamming with minimal reference to hook and line as important exposure pathways. Change the figure to a photo for clamming or netfishing.
34	ES	8	First bullet: Indicate the list of analytes included in calculating cPAH.
35	ES	8	Second bullet: Describe the fish/shellfish species and range of tissue concentrations associated included as “seafood.”
36	ES	8	Second bullet: It needs to be explained that dermal and incidental ingestion exposures to sediment associated with seafood, as opposed to tissue consumption of the seafood tissue itself, is a significant pathway.
37	ES	8	For consistency with Table 3-4b of the main text, review the following in the fourth bullet: "...from a hazard quotient of ~~2~~42 to 59 for the RME seafood consumption scenarios..."
38	ES	8 to 9	The bulleted items need clarification as to which are describing human health risk and which are describing ecological risk. Add headings/labels to the bulleted list.
39	ES	8	Seafood Consumption: Describe the source of exposure being evaluated, e.g., clams only or mix species?
40	ES	9	Two bullets are listed for ecological risk (the last two bullets); one for the 29 benthic sediment risk drivers, and one for the fish tissue risk driver. Add a bullet to show that TBT is a benthic tissue risk driver.
41	ES	9	Third bullet: Previously, risks were determined by comparison to SMS; explain how/where criteria for fish tissue were derived. Also, salmon were determined non-resident species – explain what evidence exists on home range of sole or rock fish.
42	ES	9	Make to following addition: “Excess Cancer Risk refers to the additional risk of developing cancer due to exposure to a toxic substance incurred over a defined exposure period in this case lifetime exposure.”
43	ES	9	The discussion of sediment quality standards must also identify human health considerations.
44	ES	9	The concept of Risk-based Threshold Concentration (RBTC) must incorporate the idea that if environmental media are remediated to the RBTC that the exposed population will not incur unacceptable exposure and hazard/risk.
45	ES; Figure 6	10	Insert “site” in the caption for Figure 6 Conceptual Model… to be consistent in terminology.
46	ES; Figure 6	10	The ES has not addressed sheet flow or seeps as possible sources of COCs. The figure needs to be revised accordingly.
47	ES	10	First Paragraph: Describe the reason for the investigation - i.e., majority of chemicals are bound to sediments.
48	ES	10	In the first bullet, “on average” suggests half of the locations indicate net depositional conditions. However, the text indicates that a “majority” of cores were net depositional. Clarify.
49	ES	10	In the second bullet, there appears to be 2 sets of modeling results presented here: one where scouring ranges 0.5-5 ft and another being > 2 ft with conditions being the same. Provide reason and importance for differences in model predictions.
50	ES	10	Sedimentation in the EW, third bullet: In the first sub-bullet, given 99% volume of clean sediment going into the EW and lack of ongoing COPC sources, explain why local hot spots have remained despite significant dilution processes. Similarly, explain how lateral gradients in COPCs have been maintained given these conditions.
51	ES	10	Sedimentation in the EW, third bullet: In the second sub-bullet, discuss whether sheet flow or seeps from upland sources in addition to SOs and CSOs are contaminant sources.
52	ES	11	First Bullet: Describe what chemistry changes over time have been observed to the extent that additional modeling was needed.
53	ES	11	Fourth Sub-bullet: Explain if it has been determined on a case-by-case basis which locations are CSO impacted.
54	ES	11	Footnote: Mention that dredge residuals also includes the newly exposed sediment concentrations at the new sediment-surface water interface.
55	ES; Table 1	13	List the units after Total PCBs

Comment #	Section #	Page #	Comment
56	ES; Table 1	13	Clarify how total PCBs is calculated, i.e., sum of congeners, Aroclors, etc.
57	ES; Table 1	13	Footnote TBT entry as the Organic Carbon normalization step requires explanation.
58	ES; Table 1	13	Add a note explaining TEQ as this is first use.
59	ES; Table 1	13	Add a footnote to the table describing that achievement of PRGs will be determined by comparison with a SWAC or point concentration, as appropriate.
60	ES; Table 1	13	Explain in more detail how 95% UCLs are considered.
61	ES; Figure 7	14	Clamming areas locations indicated in Figure 3 and Figure 7 don't appear to match. Clarify for consistency.
62	ES	14	Remediation Area is based on a RAL that is normalized to organic carbon. A discussion of influence of organic carbon on risks from PCBs is needed along with an explanation of the effects of remediation on organic carbon and a prediction of its recovery and its importance on risk reduction.
63	ES	14	In the second-to-last sentence revise the figure reference: "…that include 7.5 mg/kg OC for total PCBs (Figure 47)."
64	ES	14	Third paragraph: Indicate in Figure 7 where propeller scour deeper than 10 cm will occur and how deep the disturbance can extend.
65	ES; Table 2	15	Consistent with Comment #2. RAO1: The regional background has not been established at EW, how would you expect that RALs for PCBs and dioxins/furans are expected to meet an unestablished number? Remove reference to regional background.
66	ES; Table 2	15	The basis of the PCB RALs needs to be more clearly stated. Add the following: 12 mg/kg OC normalized corresponds to the SQS to protect benthic invertebrates, but the basis for 7.5 mg/kg OC normalized isn't provided. Within the FS, a key consideration seems to be the relationship between the amount of dredging and feasible reduction in sediment PCB concentrations. Given that PCB PRGs can't be attained, active remediation must be accompanied by use of institutional controls (i.e. fish consumption advisories) to insure that public health is protected.
67	ES	16	In the second bullet, clarify whether consideration was given to the habitat quality of the engineered cap.
68	ES	16	In the third bullet, sill areas have not been described or identified. They need to be defined here or earlier in the ES.
69	ES	16	In the fourth bullet, explain that benthic communities under piers are at risk and thus require sediment in situ treatment.
70	ES	16	In the fifth bullet, if the human health risk driver was incidental sediment contact not tissue consumption, this is an inappropriate example and requires revision.
71	ES	16	In the second column revise the figure reference: "…with similar engineering considerations and conditions (Figure ~~7~~8), and remedial…."
72	ES	19	In the first bullet, describe depth of dredging for various alternatives (in this case 6.6 ft) relative to vertical contaminant distribution for this alternative. Given area and cy, average dredge depth can be determined: 77 acres = 372680 sq yd * 2.20 (6.6 ft) yd deep = 820,000 cy
73	ES	19	Fifth Bullet: It is not clear what "maximum removal" implies here. Explain. It is presumed that all alternatives will strive to dredge deep enough to eliminate the surface sediment and subsurface sediments at risk to propeller scour exposures. If that is the case, state that here.
74	ES	19	Fifth Bullet: Describe depth of dredging (in this case 5.95 ft) relative to vertical contaminant distribution for this alternative. Given area and cy, average dredge depth can be determined: 100 acres = 484000 sq yd * 1.98 (5.95 ft) yd deep = 960,000 cy
75	ES	19	Sixth Bullet: The need to evaluate the 7.5 mg/kg RAL has not been explained (not included as a PRG in Table 1). Provide this explanation.
76	ES; Figure 9	20	Add "action" to the title, to read: "Comparison of Action Alternatives".

Comment #	Section #	Page #	Comment
77	ES; Figure 9	20	Proposed dredge depths all average about 6 ft, although each alternative requires a significant difference in dredging volume. Discuss the proposed neat line required for constructability.
78	ES	21	Protection of Human Health: This needs to be expanded to note that though PCBs in sediment can be greatly reduced, that PCB concentrations can't be reduced to levels associated with acceptable risks and hazards. Consequently, institutional controls, specifically fish consumption advisories, will be needed to insure that unacceptable exposures and risks will not occur. Add this language.
79	ES; Table 4	22	Revise the table to also include the hazard quotient for PCBs. The table must also include the current risk and HQ associated with PCBs. The percentage reduction in risk and or sediment PCB concentrations from current conditions must be added.
80	ES; Table 4	22	Incorporate changes resulting from Comment #340.
81	ES; Table 4	22	The time frames presented are inconsistent; some are from start of construction and others are from end of construction. For example, for Magnitude and Type of Risk, RAO 2 indicates 'Years After Construction' but RAO 3 indicates "years from start of construction". Revise so that timeframes are consistent throughout this table.
82	ES; Table 4	22	Overall Protection for RAOs 2, 3, and 4: list what COCs the data is for (as was done for RAO 1)
83	ES; Table 4	22	Incorporate changes made to Table 11-1 resulting from Comment #350.
84	ES; Table 4	22	Provide an explanation as to why in situ treatment is classified as Less Permanent. It will achieve concentrations below the incoming solids and potentially mix with them to reduce their influence.
85	ES	24	In the Compliance with ARARs section, there must be a discussion of the impacts of the solids from the Green River watershed and its contaminant levels on the remediation effort in the East Waterway and the ability to meet PRGs in the long-term. Also describe how propwash mixing is expected to mix remaining contamination/residuals layer with the residuals cover, and impacts this has on achievement of PRGs in the biologically active zone in the long term.
86	ES	24	In the second paragraph of 'Long-term Effectiveness' the following revision needs to be made for consistency with Table 4 in the ES: "All of the action alternatives are predicted to achieve PRGs or risk thresholds for RAOs 2 through 4." (Table 4 shows risk reduction for RAOs 2 and 4, not compliance with PRGs).
87	ES	24	Long Term Effectiveness: There needs to be discussion of the inability to attain risk based concentrations and the need for institutional controls.
88	ES	25	Short Term Effectiveness: This section must also address the point that active remediation will decrease risks more rapidly and with greater certainty than remedial alternatives with longer time frames that incorporate natural recovery.
89	ES; Figure 10	26	For No Action the time to achieve RAO 4 is given as 10 years. According to Table 10-1, the English sole PRG is met after 10 years, but the brown rockfish PRG is met after 25 years. The longest timeframe (25 years) needs to be shown in this figure.
90	ES; Figure 10	26	The timeframes for 2C+(7.5) and 3E(7.5) should show end of construction, but the length of the bars seems incorrect for 11 and 13 years. Correct the bar length to reflect the actual length of construction.
91	ES; Figure 10	26	Incorporate any revisions resulting from changes to Table 10-1 and Table 11-1.
92	ES; Figure 11	28	Explain what this chart would look like for PCB HQ.
93	ES	32	CERCLA Compliance: Needs to note that institutional controls will be required.
94	ES	21	Predicted Time to Achieve RAOs: make it clearer that some PRGs are not likely to be met, but that risk is reduced.
95	1	1-2	This is a short list and doesn't include many guidance documents (e.g., capping and MNR were used and cited in individual Appendices). This is not the place to list these documents, but change the language to read: "many guidance documents were referenced, including the following:"

Comment #	Section #	Page #	Comment
96	1.2	1-3	Paragraph 2: These “potential sources and pathways” are depicted in the CSM for the site; cite the source of the CSM. If it was the 2014 report, explicitly state this is the case. It is never said what the potential sources of contamination are, only transport and fate processes involved. Add this information
97	1.3	1-3	Paragraph 1: Add references to the appendices directly after each bullet.
98	1.3	1-4	Paragraph 2: Note ")" typo after ROD needs to be deleted
99	1.4.1	1-5	It is not accurate to state that the CERCLA terms anthropogenic background and natural background are similar to SMS terms regional background and natural background.
100	1.4.1	1-5	Paragraph 2: It is confusing to introduce SMS here. Suggest moving the follow-on text to a new standalone SMS definition. Second sentence does not read well and requires revision.
101	1.4.2	1-8	Paragraph 2: Add clarification that point concentrations are presented as dry wt and organic carbon normalized values.
102	1.4.3	1-10	Paragraph 2: Specify whether this construction period is for this site, or is a requirement for all sites.
103	1.4.3	1-10	Paragraph 3: Clarify that “This remedial technology” is for a selected remedial alternative, including 1 or more technologies as required.
104	1.4.3	1-10	Paragraph 3: Clarify that “contingency actions” may involve modification of the technology or methods of application.
105	1.4.3	1-10	Paragraph 3: “This FS makes a distinction”; the terms have different usages and need to be separately defined. Is there monitoring involved in the natural recovery period? Clarify in the definition.
106	1.4.2	1-8	Paragraph 2: Add clarification that point concentrations are presented as dry wt and organic carbon normalized values.
107	2.1	2-2	Clarify whether (Figure 2-1) station markers are the sediment sample locations.
108	2.1	2-2	Describe the Sill reach environment - is this a bathymetric distinction?
109	2.2	2-3	Paragraph 3: Describe where the dredged sediments generated to create the current channel were disposed of.
110	2.3	2-4	Add any observation on location/magnitude of depth change from earlier bathymetry studies to present.
111	2.6	2-5	The statistics for the sediment composition given in the summary (e.g. 40% sand and 50% fines), needs to also indicate that there is a huge variation in these values. This is described later in section 2.6.1.1, but it needs to be mentioned in the summary as well.
112	2.6	2-6	Paragraph 1: Explain the reason for this pattern (i.e., past dredging).
113	2.6.1.1	2-6	The description for the sediment particle composition only indicates the range and average (e.g. "fines fractions range from 1% to 92% with a mean concentration of 40%"). Because of the huge range for these, add the standard deviation (or similar statistic) if it has been determined.
114	2.6.2	2-7	Paragraph 2: “A hydrogen sulfide odor was common in the sample”. This is unexpected given the low TOC. Provide clarification.
115	2.6.2	2-9	Paragraph 1: Replace “as a result of” with “based on observations of”.
116	2.7	2-9	3rd Bullet: Clarify if these are evidence of seeps.
117	2.9.2	2-12	Paragraph 1: While “call” may be nautically correct, “dock” or “berth” is more understandable. Make this change.
118	2.9.3	2.14	Revise this section to reflect that the Suquamish Tribe also has a commercial fishery in the East Waterway (not just the Muckleshoot).
119	2.9.3	2-14	Paragraph 3: This is a fairly restricted area for HHRA as compared to the benthic environment impact area. This needs to be amplified in the risk assessment sections.
120	2.9.3	2-14	Paragraph 3: Clarify if this is a significant area for sediment exposure.
121	2.9.4.1	2-15	Paragraph 1: “There are no remaining tidal marsh…” This statement seems to contradict clamming as a significant risk/remediation driver and needs to be changed.
122	2.9.4.1	2-16	Bullet 1: Indicate whether the area has been mitigated for chemical contamination.
123	2.9.4.2	2-17	Paragraph 2: Explain what abundance of clams or habitat exists for these species, given the previous statement that mudflat habitat is limited.
124	2.9.4.2	2-17	Paragraph 3: Indicate where there are any feeding habitats in the EW for these species.
125	2.10.2	2-20	"that were ultimately not dredged” This is not clear. Explain if this means–“will not be dredged”.
126	2.10.3	2-20	Paragraph 3: Quantify what the deposition rate was.

Comment #	Section #	Page #	Comment
127	2.10.3	2-21	Confirm that these results were used to assess remediation methodologies later on in the FS.
128	Table 2-1	2-27 and 2-28	There are several discrepancies between data presented in this table, and data presented in the SRI. Revise the table as needed or indicate why the data presented is different than the SRI data. If these changes affect subsequent calculations, be sure to update those as well. a) For surface sediment total PCBs, the median is listed as 270, however in the SRI Table 4-23 it is listed as 290. This needs revision. b) For surface sediment cPAHs intertidal composite ("15/15" row), no median was calculated, however in the SRI Table 4-39 it is given as 230. This needs revision. c) For surface sediment cPAHs grab ("233/240" row), the median was given as 220, however in the SRI Table 4-39 it is given as 230. Revise for consistency. d) For surface sediment dioxin TEQ subtidal composite ("13/13" row), no median was given, however in SRI Table 4-34 it is given as 15.6. Revise for consistency. e) For surface sediment dioxin TEQ grab ("11/11" row), no median was calculated, however in SRI Table 4-34 it is given as 16.6. Revise for consistency. f) For MIS composite PCBs area-wide ("3/3" row), no median was calculated, however in SRI Table 4-23 it is given as 770. Revise for consistency. g) For MIS composite cPAH area-wide ("3/3" row), the mean is given as 450, however in SRI Table 4-39 is given as 1,000. Revise for consistency. h) For MIS composite cPAH area-wide ("3/3" row), no median was calculated, however in SRI Table 4-39 is given as 780. Revise for consistency. i) For MIS composite arsenic area-wide ("3/3" row), no median was calculated, however in SRI Table 4-44 it is given as 9.1. Revise for consistency. j) For MIS composite arsenic public access ("1/1" row), the superscript footnote on detection frequency needs to be a "j" not an "i". Revise. k) For MIS composite dioxin TEQ area-wide ("3/3"row), the superscript footnote on detection frequency needs to be an "i" not a "j". Revise. l) For MIS composite dioxin TEQ area-wide ("3/3" row), no median was calculated, however in SRI Table 4-34 it is given as 13.2. Revise as appropriate. m) For MIS composite dioxin TEQ public access ("1/1" row), the superscript footnote on detection frequency needs to be a "j" not an "i". Revise. n) For subsurface dioxin TEQ (last row), add "TEQ" following the contaminant name.
129	2.11.2.1	2-29	Based on FS Table 2-1 and SRI Table 4-39, revise the following at the end of the first paragraph (following the table notes): "cPAHs were detected....with concentrations ranging from ~~1,900~~18 to 17,000 ug TEQ/kg dw (Table 2-1)." (1,900 is the mean value, not the minimum).
130	2.11.2.1	2-34	Following the discussion about how many chemicals had exceeded at how many locations (page 2-30), further discussion is given for mercury and TBT but no others. It would be appropriate to add a discussion of the other chemicals as well.
131	2.11.2.1	2-34	Correct the typo at the end of the first paragraph: "...0.30 mg/kg dw (SRI Map 4-~~35~~36; Windward…"
132	2.11.2.1	2-34	Correct the typo at the end of the second paragraph: "...(Figures 2-19a ~~through~~and 2-19~~c~~b)."
133	2.11.3.2	2-37	Bullet 2: Tidal pumping causing groundwater discharge/seep generation must be explicitly included/addressed in the CSM.
134	2.11.3.2	2-39	See previous comment: Lateral discharge needs to include seepage and must be explicitly stated.
135	2.11.3.2	2-39	Text indicates “extensive groundwater and seep information is available” but following text only discusses groundwater results. Summarize the seep sample results.
136	2.11.3.2	2-40	Groundwater monitoring should resume at both USCG and T-25 due to exceedance of contaminants in both groundwater and sediment. If data indicates that groundwater is an ongoing source for sediment contamination, source control should be conducted.
137	2.13	2-48	Add a discussion as to whether PCBs are an ongoing source and if multiple sources can potentially exist. Explain if chemical fingerprinting has been performed to determine whether unique sources exist.

Comment #	Section #	Page #	Comment
138	2.13	2-49	Another bullet needs to be added in this section to briefly summarize sub-surface sediment conditions
139	2.14.1 & 2.14.2	2-50	Both of these sections describe geotechnical properties. It is unclear what the difference between these two sections is. These sections need to be combined, or rearranged so that it is clearer why there are two separate sections.
140	Ch 3	All	The discussion regarding the development of the seafood consumption pathway should be expanded to more fully explain that the tribes agreed to use the Tulalip consumption rate as the human health RME based on experience that risk-based scenarios will result in concentrations below natural background levels. The Suquamish Tribe does not agree that Tulalip consumption rates accurately represent potential Suquamish exposures or risks.
141	Table 3-1	3-4	Revise table name to indicate surface sediment.
142	3.2.1	3-10	This text needs to be struck: "However rates may be achieved in the EW at some future time. ~~The rates used are generally similar to those for other populations who consume large quantities of seafood in the absence of seafood consumption health warnings.~~" Additionally, it needs to be noted that seafood consumption rates relevant to Puget Sound should be used to assess risks for smaller cleanup sites within Puget Sound. Using the argument that small areas can't support FCRs relevant to Puget Sound will result in failure to restore Puget Sound to a state that will permit Native Americans and other high fish consuming populations to safely consume the large quantities of fish that they desire. In the case of certain Native American tribes, these high fish consumption rates are guaranteed by treaties signed by tribes and the U.S. government. Further information needs to be summarized on the basis of selecting FCRs based on Tulalip Tribes' data for RME vs. Suquamish Tribe data. Specifically, that EPA's Puget Sound Tribal Seafood Consumption Risk Assessment Framework was used to determine whether Tulalip or Suquamish Tribal data were appropriate for EW risk assessment purposes. The Framework provides a starting point for EPA in discussions/negotiations to develop seafood consumption risk assessments. For the LDW HHRA, the Suquamish Tribe did not object to the use of an FCR based on Tulalip Tribes' data, as background COC concentrations exceeded risk based COC concentrations, regardless of which tribal data were used. The Suquamish position on the EW HHRA needs to be noted here. Reference earlier comments from the Suquamish Tribe (e.g. Comment #140) or the EW SRI.
143	3.2.1	3-11	There should be further discussion of HHRA for PCBs. Specifically, PCB cancer risks may be assessed using total PCBs and the Aroclor slope factor or dioxin-like PCB TEQs and a dioxin slope factor. Bioaccumulation processes may enhance the carcinogenic risk of commercial PCB mixtures. The total risk posed by environmental PCBs is bounded on the lower end by total and dioxin-like PCB risks considered separately, and at the upper end by the sum of these individual risk estimates. It is recognized that the dioxin-like PCB contribute to cancer risk estimates posed by total PCBs and that the sum of total PCB and PCB TEQ risk estimates likely involves double counting of risk.
144	3.2.1	3-13	Revise as follow: "…seafood consumption categories (i.e., fish, crabs, clams, geoduck, and mussels) across receptor types." Also note that risk associated with many chlorinated pesticides was based largely on non-detect results.
145	3.2.1	3-12 & 3-13	When discussing the total excess cancer risk as shown in Table 3-4a, clarify which of the two "total excess cancer risk" rows is being used. Both are presented in the table, but only one is used in the narrative discussion.
146	3.2.1	3-13	Note that the higher contribution of cPAHs to overall children's cancer risks is because cPAHs have a mutagenic mode of action and pose greater risks to children than adults. EPA risk assessment procedures account for the greater cancer risks mutagens pose to children.
147	Table 3-5	3-18	Include PCB TEQ risks.
148	Table 3-5	3-18	The second column indicates "% of total", but Table 3-4a presents two "total excess cancer risks". Add a footnote to this table (3-5) to indicate which total was used to determine this percentage.
149	Table 3-5	3-18	A suggestion: This information would be much better presented as pie charts.
150	3.2.2	3-20	Include the number of days of exposure (i.e. 120 days per year) for the RME clamming scenario. Note that the 183 day per year clamming scenario was to typify high end exposure and was included at the request of the Suquamish Tribe.

Comment #	Section #	Page #	Comment
			Also note that the total HI for any exposure pathway was less than 1.
151	3.2.2	3-21	Although the criteria for direct contact COC consideration were exceedance of a cancer risk of 1 x 10^{-6} or an HQ of 1, the total HI for each exposure scenario did not exceed 1. Therefore, non-cancer hazard was not the basis for selection of any direct contact COC.
152	Table 3-8	3-25	Also note that many of the analytical results upon which exposure point concentrations (EPCs) were based consisted of non-detects.
153	Table 3-8	3-25	Since pesticides are addressed in this table, include discussion of analytical results and historical use either in the table footnote or the corresponding text.
154	Table 3-10	3-28	For the risk levels in the column headings, change to the scientific notation (e.g. 10^{-6}) to be consistent with how risk levels are discussed elsewhere in the FS.
155	Table 3-12	3-30	The equations notate the ingestion rate as "1R", it needs to be revised to "IR".
156	3.3.4	3-33	Revise the last sentence to indicate that clam cPAH monitoring following sediment remediation is required: "…monitoring following sediment remediation and source control will~~may~~ be needed to determine…"
157	Table 3-13	3-34	Add a footnote to indicate an RBTC for cPAHs was not determined (as described in the preceding narrative).
158	3.4	3-35	Identify that arsenic was not a COC for seafood consumption because although total risk posed by arsenic was significant, the site related increment of risk was not. Additionally, there doesn't appear to be any discussion of seafood background arsenic concentrations. This should be added.
159	3.4	3-35 to 3-36	In the "Key findings for the baseline HHRA," repeat here that arsenic risks posed by seafood consumption were not significantly elevated above background.
160	Figure 3-1	3-38	Clarify how clamming areas were identified. (e.g., water depth, substratum site use, other?)
161	Chapter 4	General	Add a discussion that states for contaminants where RBTCs can be met, the PRG needs to be set such that following remediation, the 95% UCL on the mean concentration results in HIs of 1 or less for chemicals with a similar mode of toxicity and cancer risks of 1 in 1,000,000 to 1 in 10,000. For chemicals where RBTCs are less than background, remediation needs to occur until the waterway and background contaminant distributions are not significantly different. This would likely be determined using a non-parametric group comparison test. Another approach that is used in the FS that requires further discussion between the EPA and EWG, would be to examine inputs from the LDW, Elliott Bay, and lateral loading after source control has been implemented. This is less prescriptive than the other approaches.
162	Table 4-1	4-3	Fix the following typos: a) "Dredge/Fill…." row, and "Federal" column: remove extra closed parenthesis after "33 CFR 320-330". b) "Floodplain Protection" row, and "Federal" column: remove extra closed parenthesis at end
163	Table 4-1	4-3	Include CERCLA and compliance with CERCLA guidance in this table.
164	4.2.1	4-7	Clarify that HI>1 generally warrants a response action, but that the HI includes both background plus site-specific exposure, so achieving HI< 1 may not be possible.
165	4.2.1	4-7	2nd full paragraph: To be more consistent with the SMS rule, state that the SMS target for the SCO is a RBTC risk of no greater than 1x10^{-6}, and the target for the CSL is a RBTC risk of no greater than 1x10^{-5}.
166	4.2.1	4-7	"RAO 1: Reduce risks associated with the consumption of contaminated resident EW fish and shellfish by adults and children with the highest potential exposure to protect human health."

Comment #	Section #	Page #	Comment
			RAO 1 needs to include language regarding the protectiveness of contaminant concentration reduction. A threshold criterion is the protection of human health. It is noted that achieving this RAO may require institutional controls once active remedial alternatives have been exhausted; this needs to be discussed in this section of the FS. More conversation between EWG and EPA on this topic is needed.
167	4.2.1	4-7	"Lifetime excess cancer risks from human consumption of resident EW seafood are estimated to be greater than 1×10^{-5} for some individual carcinogens, and greater than 1×10^{-4} for carcinogens cumulatively under RME seafood consumption scenarios." Actually, for all of the individual risk driver COCs for the RME tribal seafood consumption pathway, the risk exceeds 1×10^{-4} (e.g. cPAH TEQ-1 x 10^{-4}, total PCBs-1 x 10^{-3}, PCB TEQ-7 x 10^{-4}, Dioxin Furan TEQ-1 x 10^{-4}). Revise this sentence to be consistent with this data.
168	4.2.1	4-8	2nd paragraph: "…anadromous fish are not included" (i.e., salmon). Clarify if any other named receptors also fall into this category.
169	4.2.1	4-9	RAO 2 needs to include language regarding the protectiveness of contaminant concentration reduction. A threshold criterion is the protection of human health. There needs to be mention in this section that achieving this RAO may require institutional controls once active remedial alternatives have been exhausted.
170	4.2.1	4-10	Paragraph 1: Indicate that earthquakes could increase exposure by mixing/liquefaction of surface and subsurface sediments
171	4.2.1	4-10	Risk from direct contact from clamming is assumed to occur in the upper 25 cm based on harvest of butter clams, littleneck clams, and cockles. Based on the SRI, Eastern soft-shell clam have also been found in EW, and are expect to be harvested. This is significant because Eastern soft-shell clams burrow to a depth of about 45 cm. LDW also includes Eastern soft-shell clams, because of which the LDW ROD considers 45 cm as the compliance depth. Revise the expected exposure depth to 45 cm for consistency with LDW and to reflect the presence of the Eastern soft-shell clam in EW.
172	4.2.2	4-12	At the end of the first paragraph in this section it is stated, "The recontamination predictions indicate that…" Give a reference to where the results of the recontamination analysis is presented.
173	4.2.2	4-12	Paragraph 3: Reference the section where source control activities for PCBs being considered are discussed.
174	4.2.2	4-12	Paragraph 3: Indicate that fate and transport (i.e. distribution and depth) of current PCBs as the key risk driver has not been explained and may be a major impediment to achieving RAOs.
175	4.3.1	4-14 to 4-17	This section seems to suggest that the SMS defines EPA's position on the various RAOs. It must be clear that the SMS does not define EPA's view as to how these RAOs satisfy CERCLA, and that EPA's views are considered independently from satisfaction of Ecology's SMS Rule, even though some of these considerations are the same.
176	4.3.1	4-14 to 4-17	When first discussing RAOs, include the area of concern associated with them. Similarly, when describing SMS indicate that it applies on a point by point basis.
177	4.3.1	4-14	2nd paragraph: The text says "Under the SMS, *sediment cleanup standards* may be established…" Revise the nomenclature to be more in line with SMS, and call the sediment cleanup standards by their correct name of sediment cleanup level (SCL).
178	4.3.1	4-14	2nd paragraph: Later in the same paragraph "The *cleanup level* may be adjusted…" Use SCL instead.
179	4.3.1	4-14	2nd paragraph: The relationship between the SCL and PRG must be made clearer in the text. Change the paragraph to read: "The SCO is the higher of the risk-based levels ($1x10^{-6}$), PQLs, and natural background. The CSL is the higher of the risk-based levels ($1x10^{-5}$), PQLs, and regional background. The SCL is originally set at the SCO, but may be adjusted upward to the CSL. As such, the SCL in SMS is equivalent to the PRG in CERCLA."
180	4.3.1	4-14	2nd paragraph: Appendix A does a better job of discussing this using language from the WAC. Revise the discussion here to be consistent with Appendix A.
181	4.3.1	4-15	Paragraph 2: Move this paragraph about natural background to after the third paragraph of Section 4.3.1 (i.e. following the discussion of RAO 1).
182	4.3.1	4-15	Paragraph 2: Clarify that natural background is the default in areas where regional background has not been determined, assuming it is higher than the PQL, or risk based concentration.

Comment #	Section #	Page #	Comment
183	4.3.1	4-15	Paragraph 3: Clarify that although regional background is not separately evaluated it is inherently included in the total exposure estimate.
184	4.3.1	4-16	At the end of the page it is stated, "…as discussed in Section 4.3.1." Since this is written in section is 4.3.1, verify that this section reference is correct. If so, change to "earlier/later in this section".
185	4.3.2	4-17	Paragraph 2: "Sediment RBTCs for total PCBs were calculated for the $1x10^{-4}$ excess cancer risk…" Clarify that, if following SMS, this shouldn't exceed $1x10^{-5}$ for the CSL. Ultimately it doesn't matter as the RBTC is below natural background.
186	4.3.2	4-17 to 4-18	Indicate that compliance with risk based standards will be determined using the 95% UCL on the mean.
187	4.3.3	4-18	There should be a discussion of arsenic background tissue concentrations and their relationship to site tissue concentrations supporting that arsenic is not a site related COC.
188	4.3.3.1	4-19 to 4-23	The impact of analytical sensitivity on background concentrations needs to also be evaluated by setting non-detects to zero.
189	Table 4-3	4-21	The SMS-defined natural background value for 'Total PCBs as Congeners' is not consistent with the current (2015) version of SCUM II and must be revised. Also revise this value where it is included elsewhere in the FS (e.g. Appendix. A).
190	4.3.3.1	4-22	Footnote 37 indicates that an updated SCUM II is anticipated in summer 2016. As this date has now passed, update the expected SCUM II revision date, or remove this footnote.
191	4.3.3.1	4-22	Briefly describe what 90/90 UTL means.
192	Table 4-4 & Appdx A, Part 2	4-25 & 2 in Appdx	Check inconsistency in reported fish risk PRG values derived using the mean of the tissue RBTCs. Appendix text (page 2) indicates that FWM-derived values were 390 ug/kg dw for English sole and 230 ug/kg for brown rockfish while tables (in Appendix and main report) indicate 370 ug/kg for English sole and 250 ug/kg for brown rockfish. Revise as needed for consistency throughout the FS.
193	Table 4-4	4.25	There needs to be a discussion of developing tissue PRGs for PCBs. This will be important in examining adequacy of remedial actions in cases where it is difficult to determine the relationships between levels of contaminants in sediment and tissue. Evaluation is required for the uptake of contaminants in seafood following remediation activities. Tissue trends will nee to be examined.
194	Table 4-4	4-26	Remove the abbreviation note for "nc" as it is not used in the table.
195	Table 4-5	4-28	a) The frequency of detected concentrations above SQS (last column) for 2,4-dimethylphenol needs to be revised to 0.4 (not 0). b) Remove the abbreviation notes for abbreviations not used in the table (e.g. DDT, EF, ne)
196	5.1	5-3	Paragraph 2: Indicate whether high flow periods could be part of observed episodic mixing.
197	5.1	5-3	Paragraph 2: Explain why only areas near the pier edge should be subjected to prop wash erosion. What does the Cs-137 peak relative to core location indicate in this regard? (It isn't possible to see where the cores were taken in relation to the pier edge).
198	5.1.2	5-6	In footnote 48, indicate how many cores were not analyzed (and instead were archived).
199	5.1.2	5-7	In the second paragraph, the third bullet indicates that areas that had no cesium peak were assigned a net sed. rate based on the lead data. In addition, the fourth bullet states that operational areas that included no cores (areas that had been previously dredged) "were assigned one of the representative net sed. rates based on adjacent areas." This statement needs some clarification. Specifically, it appears from review of Figure 5-1 that the closest Cs-based data were used to assign a net sed. rate for each area that did not have a core, even if there was closer Pb-based data. For example, area 1A-2 has an adjacent area (1A-3) where the core provided a Pb-based sed. rate but no Cs-based rate. The authors did not use this adjacent core Pb-based rate to represent 1A-2. Instead they appear to move upstream all the way to cell 5 where Cs-based rates are available. A similar process appears to have been used to develop sedimentation rates for cells 1C and 2. Ensure that the text on page 5-7 accurately describes the methodology used to assign sedimentation rates, and provide further justification on the use of more distant Cs-based data over nearer Pb-based data. A solid justification is important on this issue because the general data trend indicates a lower sedimentation rate in the north compared to the south. As described on page 5-3, the cores in the north did not have clear Cs peaks and the Pb-based data indicates a rate of 0.5 cm/yr. It appears that the sedimentation rates used in operational areas 1A-2, 1C, 2, and even 1B-1 would be better represented by a rate of 0.5 cm/yr. These changes need to be made, and modeling implications discussed with EPA.

Comment #	Section #	Page #	Comment
200	Table 5-1 (& Figure 5-1)	5-9	During past meetings there was much discussion between EWG and EPA about net sedimentation rate during which a consensus was eventually reached on what values were appropriate for the FS. EPA is not challenging the final decision on the sed. rate, but the data presented in the FS must support the final agreed-upon value in a logical manner. The following comments include some editorial changes, along with a few more significant observations that require further explanation to provide a logical argument. a) Replace the column for "Geochronology Cores Located in Area", with a column for "Geo. Cores used to Determine Rate in this Area." This would allow the reader to see all the data that went into the rate calculation for that area. This would also more clearly explain what cores were used for areas that don't have cores, and areas where cores from adjacent areas are also used with cores in that area. This revision may resolve some of the following comments. b) For Area 1A-2, the rate was based on cores in "Areas 1A-1 and Area 5," however there is no core located in 1A-1, and Area 5 is quite far away. Provide further justification as to why the cores in Area 5 were preferred over core GC-08 in Area 1A-3 which is significantly closer to Area 1A-2. c) For Area 1A-3, the Pb-210 high-end rate was given as 0.49, however in SRI Table 3-3 is given as 0.48. This needs to be corrected. d) For Area 1A-6, core GC-09 was listed as within that area (third column), however it is not. In the description of the Basis, GC-09 is described as part of Area 3, which concurs with Figure 5-1. Revise for accuracy. e) For Area 1A-6, the basis for the rate is described as "Pb-210 data from GC-09". In SRI Table 3-3, the Pb-210-based sedimentation range for GC-09 is listed as 0.35-1.4 with a best estimate of 0.56. The final sed. rate chosen in the FS was 1.6, which does not follow directly from the data for core GC-09. Provide further explanation as to how 1.6 was chosen. f) For Area 1B-1 in the Basis description, core GC-09 is described as being in Area 1A-6, but it is located in Area 3. Correct for accuracy. g) For Area 1B-1, nearby cores GC-09 and GC-12 were used. From Figure 5-1, a reader would also see that core GC-08 is nearby. Provide an explanation as to why this core was not also used. h) For Area 1C, the Basis description indicates cores from Area 1B-1 were used, however there are no (non-archived) cores in Area 1B-1. Correct which core is being used for the basis; it appears core GC-05 in area 1B-2 is nearest. i) For Area 3, GC-09 needs to be added as a core in this area. j) For areas with multiple cores, show the Cs/Pb data for each of the cores. If, as suggested in comment (a), the cores listed are the ones used to calculate the net sed. rate, adding all the core data will help the reader understand al the data that supports the final rate assigned. Add all core data as appropriate. k) For Area 4A, the Basis description indicates that data from adjacent areas suggest that a higher rate (1.6) is more appropriate than the data from Area 4a itself would indicate (0.5). Further justification as to why the core in Area 4A is not appropriately representative needs to be provided. l) For Area 4B, core GC-16 is listed as in this area, but it needs to be core GC-15 m) For Area 5, core GC-15 is listed as in this area, but it needs to be core GC-14. n) For Area 6, the Cs-137 low-end value is listed as 1. However, in SRI Table 3-3 for the two cores in the area, it is listed as 1.8 and 'uninterpretable'. Either revise or provide justification for why 1 was chosen for this table. o) For Area 7, the Basis for the sed. rate of 1.6 was given as data from core GC-19A (in Area 7) and cores in Area 6. However, Area 6 was determined to have a sedimentation rate of 0.5, so this doesn't support the rate determined for Area 7. Revise the Basis for the sed. rate for Area 7 as appropriate
201	Table 5-2	5-13	The "vessel operating areas" listed in the first column do not match up with the area labels used in Figure 5-1 (and other figures). Revise this column to be consistent with the figures, or at least include a new column so it is easier to understand how the different labels relate to each other.
202	Table 5-2	5-13	Based on STER Table 5-4, revise the max near-bed velocity for Area 1C: "~~2~~3.0"
203	Table 5-2	5-13	Based on STER Table 5-4, revise the max bed shear stress for Area 4A (existing): "~~(2.0 Pa)~~ 0.03 (2)".
204	Table 5-2	5-13	For the row "Area 4 (future operations)" remove the "future conditions" from columns 3 and 4; it is unnecessary given that this is indicated in the first column.
205	Table 5-2	5-13	Correct the typo in footnote 1: "…can be found in Section 5.1.2 and Table 5-~~1~~2 of the EW STER…"

Comment #	Section #	Page #	Comment
206	5.2	5-14	Clarify in this section that the RMC will be placed over the entire area (as is indicated in Appdx B and Appdx J), not just dredging areas.
207	5.3.1	5-17	Section 2.11.3.2 notes seeps as a possible lateral source of COCs. Explain why seeps are not addressed here. Also explain the contribution of lateral sources from erosion of underpier sediments by scour.
208	5.3.1	5-17	In the first paragraph on this page, it is stated that bounding values were available for LDW lateral sources, however in Table 5-3 no lateral bounding information is provided. Revise either the paragraph or table as needed.
209	5.3.4	5-26	Paragraph 2: The figure estimate doesn't include the lateral distance and depth of disturbance (i.e., volume of sediments). Add this information.
210	5.3.5	5-27	It is not clear what this 90% figure represents – reductions observed in other studies? Provide a reference for this value.
211	5.3.4	5-27	First full sentence "…the results of the box model evaluation were determined through a sensitivity analysis described in 2.4 of Appendix J". EPA could not find a section 2.4 to Appendix J. Clarify the reference
212	5.3.6	5-30	The last sentence of Section 5.3.6 references Appendix B Part 2 for the SWACs; Appendix B Part 2 is the scour depth analysis. Correct the reference.
213	5.3.7	5-30	Define a SWAC and how it is applied to the EW FS in this section.
214	5.3.8	5-30	In the last full sentence of the page, the text discusses the same Alternative 2B(12) as having either ENR and in situ treatment for underpier areas. Explain further what this means and the difference between ENR and in-situ.
215	5.4.2	5-34	In the last paragraph "Appendix B, Part 5 provides a detailed discussion of how chemistry assumptions used for the recontamination potential evaluation for upstream and EW lateral sources were developed." It does not appear that Part 5 includes a discussion of EW lateral loads. Clarify the reference.
216	Table 5-6 & Table 5-7	5-35 & 5-37	For the LDW Laterals rows, it is confusing to have the low and high bounding values be the same range, particularly given the low end of the range is actually "n/a". Either revise to a single value, or provide an explanation in the footnotes.
217	5.6.3	5-45	As mentioned in Section 2.11.3.2, underpier sources, i.e., seeps, sheet flow, etc., extend the area of concern to the entire boundary of the EW Operable Unit, and are not restricted to the SO only. Potential loading needs to be estimated for the entire upland OU that drains into the EW.
218	Figure 5-2		Scour boundaries shown in the Figure 5-2 do not appear limited in extent toward shore where piers exist and access by prop scour would abate. Data has shown that underpier sediments are stable, thus not scoured. Add this information to the discussion.
219	Figure 5-1		Either remove the cores that were archived, or indicate them with a different symbology. It is misleading to list them with the "Geochron Core with Net Sedimentation Rate" when they are not being evaluated for sedimentation rates.
220	Figure 5-2		Note 1 references "Attachment 4 of Appendix F". This appears to be an error as Appendix F does not contain attachments. It seems likely this reference should be for "Appendix B Part 2". Revise as appropriate.
221	Figure 5-2		Note 3 describes that the inner areas are expected to "experience similar scour depths as the berthing areas". Currently these inner areas are shaded grey which makes it visually appear that there is no data or no scour is expected. Instead, it would be more appropriate to include a colored hashed/striped symbology, to indicate that some scour is expected but it is uncertain how much. Revise.
222	6.1.1	6-3	In the second paragraph, the data used to establish the area of remediation for north of the Spokane Street Bridge is described. But it does not describe what data was used under and south of the bridge for remedial decisions. Add this data/information.
223	6.1.2.1	6-4	It needs to be clarified here that the remediation area is for point based compliance and that the approach for developing compliance on an area basis is provided in Section 6.2.2. In determining whether the RAO is met, two approaches need to be discussed in this section: 1. If the PRG is based on risk and the SWAC is less than the PRG. This approach still has issues in that the SWAC will meet the PRG but the 95% UCL on the mean will potentially result in failure to satisfy the RAO. 2. If a group comparison test indicates that site and background distributions are not significantly different. It is unclear as to how to incorporate use of Thiessen polygons into a group comparison test.

Comment #	Section #	Page #	Comment
224	6.1.2.1	6-4 to 6-5	In the last paragraph (going onto the next page) it is described that Thiessen polygons were derived first from surface (0-10 cm) samples, and then shallow subsurface (0-2 ft) samples were added and new polygons were generated. a) In Figure 6-1, footnote 2 indicates that only some shallow subsurface samples were included, which is not consistent with the description in the text. This description must be added to the text and further developed to fully describe which data were and were not included. Also, explain why polygons were redrawn for some of the added subsurface data but not for all of them (i.e. Figure 6-1 shows some polygons with multiple data points). b) It is noted in Appendix H (pg. 5) that seven shallow subsurface cores were not included in the development of remediation areas because surface sediment concentration data were below RALs or toxicity testing passed. Excluding these cores leads to cores with surface sediment >RAL remaining in unremediated areas, which is very concerning especially given the extensive mixing which is assumed in the upper interval. The justification for not including these cores needs to be included here in Section 6 and greatly expanded upon to explain why the surface data is more representative than the shallow subsurface data particularly given the deeper mixing expected. For example, when using the justification that the surface data passed toxicity tests, if the shallow subsurface data also passed toxicity tests, or at least had similar chemistry, then excluding the subsurface may be appropriate. But, if the shallow subsurface did not pass toxicity, or if the chemistry is different, then exclusion may not be appropriate. Add this information. c) Based on Figure 6-1, it appears several shallow subsurface core data were not included (e.g. S19, S14, S9, S02, S10, etc.) which also don't correspond to the seven excluded cores described in Appendix H. Ensure the expanded description of what data was included/excluded in the Thiessen polygon development includes these (and all other excluded) cores.
225	6.1.2.2	6-5	It is stated: “Other intertidal areas that are entirely riprap or are not exposed because they are beneath an overwater apron or pier are not included in the intertidal area evaluated for RAO 2 (see Figure 2-11).” Describe the potential for these areas to have concentrations above PRGs and to recontaminate the site post cleanup.
226	6.1.2.2	6-5	This section describes the method used to merge the composite samples collected from the intertidal areas with the Thiessen polygon interpolation for the subtidal areas. Arsenic and cPAH are the only COCs mentioned. In Section 3.2.2 (Table 3-6) PCBs and dioxins are also mentioned as potential risk drivers for dermal contact (RAO 2). It is unclear from the text, so an explanation is needed as to whether dioxin and PCB concentrations interpolated into the intertidal areas use the same methodology used for arsenic and cPAH.
227	6.1.3.1	6-6	The FS baseline data set is missing at least one important set of data collected in April 2013 from underneath and adjacent to the Coast Guard Pier 36. The omission of this data is significant since the surface sediments sampled in this area have (among other contaminants) cPAH and total PAH concentrations that are the highest observed in the East Waterway OU. While inclusion of this data will not change the overall alternatives analysis, it will require modifications to be made to several of the figures representing areas exceeding SQS (Figure 6-1), dioxin/furan RAL (Figure 6-4), cPAH RAL (Figure 6-5) and areas requiring remediation (Figure 6-7). The text in this section (page 6-6) indicates that the FS baseline dataset represents samples (surface and subsurface) collected between 1991 and 2010 yet it also states that 80% of the data has been collected within the last 8 years. While EPA is arguing (above) for the inclusion of a more recent data, it is unclear if the FS baseline data in its current form even includes information from 2008 – 2016.
228	6.2.1	6-9	LAET has been defined in previous table notes but further description and application here is needed.
229	6.2.1	6-9	In the first paragraph of this section, SQS benthic criteria are used to evaluate exceedances in the top 10 cm of the sediment. In the second paragraph, TBT exceedances are evaluated in the top 0-2 ft. Explain if evaluating the SQS criteria in the top 0-2 ft of sediment would change the area of exceedance.
230	6.2.1	6-10	Although SQS values were exceeded for 29 benthic risk driver COCs, the FS proposes to develop RALs for a subset of nine “indicator SMS chemicals” because “site-specific analysis shows that remediation to address these nine contaminants also addresses the other SMS contaminants that are above the SQS because the COCs are co-located.” Provide more detail on this site-specific analysis to justify eliminating RALs for the other 20 SMS contaminants. Explain if the absence of RALs for these chemicals have any potential ramifications for long-term monitoring and future decisions regarding achieving RAOs.

Comment #	Section #	Page #	Comment
231	6.2.1	6-10	This section never explicitly states that the RALs are being set equal to the SMS. It is implied in previous sections, but given this is the section a reader would reference to find out how RALs were set, it needs to be very clear here.
232	6.2.2	6-11	Provide more justification on how the Remedial Action Levels were selected. It would seem that consideration of PCBs coming in laterally and from upriver would be of key concern.
233	6.2.3	6-13	Explain if potential recontamination of intertidal areas from subtidal areas was considered.
234	Figure 6-1	6-15	Hash mark pattern for dock/pier in legend doesn't match figure; should slant forward. Correct this discrepancy.
235	Figure 6-3	6-17	This figure combines the RAL exceedances for surface and subsurface sediment. Revise/add figure to indicate separate exceedances so the potential remediation areas are more clearly defined (i.e., clean surface over contaminated subsurface would not require remediation).
236	Ch 7	General	Caps in intertidal areas and areas with suitable clam and/or geoduck habitat must be of sufficient depth to provide clean, suitable substrate for the clams to live in.
237	7.2.4 & Table 7-2	7-16 & 7-52	Text states that ENR placement in underpier areas would be difficult and ineffectual because of steep side slopes. While the slopes under some piers in the East Waterway are steep, there are other areas (e.g., within Slip 36) where this is not the case. Furthermore, thin-layer capping of underpier areas (akin to ENR) has been demonstrated to be an effective means of blocking exposure to underpier contamination in nearby areas such as the Todd Shipyard. Given the access and safety issues associated with hydraulic dredging under piers and the costs/logistical obstacles to pier demolition, it is important to keep options such as underpier ENR on the table particularly for areas with surface sediment contamination that is well in excess of RALs and for which MNR or in-situ treatment may not be options.
238	7.2.4	7-17	1st Bullet: Explain the technical basis for the 9" cap thickness - i.e., does the steady state value at the sediment water interface meet PRGs.
239	7.2.4	7-17	2nd Bullet: Same comment as above; 15" may address scour depth but explain if it controls chemical migration.
240	7.2.5	7-18	Paragraph 1: This entire section doesn't appear to address reactive mat capping, only the placement of loose materials. Add or indicate why it is not applicable.
241	7.2.5.1	7-19	Add mention of ground water vertical migration which has a very significant effect on the cap design
242	7.2.5.2	7-20	Paragraph 2: Add mention of reactive cap mats, i.e., CETCO, that are designed to work on steep slopes.
243	7.2.5.3	7-21	Note that depth of over-dredging to accommodate the necessary cap thickness would also depend on the residual un-dredged COC concentration, which would provide the new contaminant source loading the overlying cap.
244	7.2.5.4	7-22	1st paragraph: Add the following considerations to this section: a) "Because capping disturbs relatively little in situ contaminated sediment." Is not necessarily true and is operator-dependent (among other factors). b) Capping where predredging might be required for no net loss of navigation depth is a significant source of disturbance. c) Capping may also require a habitat enhancement layer to accelerate recolonization of benthic community. d) Placement of cap material as overburden may have the effect of compressing underlying sediment layers and "squeeze" porewater from depth into the overlying cap and water column.
245	7.2.6	7-23	Add the following considerations to this section: a) Impacts on fish tissue concentrations can occur well downstream of the dredging action (e.g., GE Hudson). b) Turbidity plume control may still be required but difficult to implement in the deep and high current EW waters.
246	7.2.6.1	7-23	Note that environmental buckets may be used to limit sediment resuspension during retrieval of sediment through the water column.
247	7.2.6.1	7-24	Indicate that: a) Barge dewatering may be subject to treatment if concentrations are shown to exceed WQC. b) Positional control technology/differences of the fixed vs. cable arm methods should be discussed.
248	7.2.6.3	7-26	As was discussed during WPAM #9, statistics on workplace accidents are not appropriate for the main body of FS. A general discussion of the high risk of diver-assisted dredging is fine, but specific OSHA statistics need to be removed.

Comment #	Section #	Page #	Comment
249	7.2.6.5	7-27	Clarify that reducing the failure to delineate and dredge missed inventory must be addressed in the sampling conducted for the remedial design.
250	7.2.6.5	7-28	Add notes that: a) Placement of the RMC may be subject to resuspension and uncontrolled dispersion. b) In addition to cost, the relatively coarse nature of the sediment would minimize dispersion during RMC placement.
251	7.2.7.1	7-30	Include a note that reactive material placement within geotextile layers, and with multiple reactive agents (i.e., apatite, AC, organoclay), has been successful.
252	7.2.7.1	7-31	In Situ Treatment Effectiveness Assumptions: More discussion of the 70% reduction efficiency specifically for the EW site is needed, addressing the sediment COCs and concentrations involved and resulting biota tissue values.
253	7.3.2	7-39	Correct the typo: "The Roosevelt Regional Landfill is operated by Allied Waste near ~~Goldendale~~Roosevelt, Washington…"
254	7.3.3	7-40	Discuss whether much of EW sediments qualify for beneficial uses\daily landfill cover. Also discuss whether there are opportunities to use dredged sediments as possible base material for wetlands creation.
255	7.6	7-51	Consistent with Comment #10, this section and Table 7-2 need to clarify that the "authorized navigation depth" will be the future anticipated depth following the Seattle Harbor deepening project.
256	Table 7-3	7-54	This table is missing the T-25 Nearshore CMA. Add this information.
257	7.8.2	7-62,63	Consistent with Comment #237, revise to include ENR as a possible remedial technology subject to considerations of access and underpier slope.
258	7.8.2	7-62	Second paragraph: Text states that "…underpier areas have high recovery potential following the remediation of adjacent open-water areas because of sediment exchange between these areas." However, to the extent that surface and subsurface sediments in underpier areas contain historic contamination from activities associated with the adjacent shoreline, they may also be a source of continuing recontamination to the remediated open-water areas. Add text to this section acknowledging this alternative view on the recovery potential and influence of underpier areas.
259	7.8.2	7-62	Last paragraph on page: The list of dredging-specific action levels to trigger limited underpier sediment removal must also include action levels for cPAHs, dioxin, and TBT since particularly high concentrations of these contaminants have been found in underpier areas.
260	7.8.2	7-63	Last paragraph: Explain if a reactive mat cap may be a viable technology here.
261	7.8.4	7-65 & 7-66	The summary for the Sill Reach indicates that in situ was eliminated, however in the last paragraph it is stated that in situ was retained. Revise this section for consistency regarding the utility of in situ in the Sill Reach and also to ensure consistency with this section and Table 7-4..
262	7.8.8	7-69	In the third paragraph it is stated that ENR was retained in conjunction with partial removal in this CMA to gain appropriate clearance for future navigation activities. Explain what this means. Also explain if future navigation activities include the proposed deepening of the navigation channel.
263	8.1.1.2	8-3	Explain what observations of debris have been made for under pier areas.
264	8.1.1.2	8-3	Explain if there any concern over pier stability by dredging too close to the pier.
265	8.1.1.3	8-3	Additional issues surround barge filling and transport may include odor, noise, navigation restrictions, and many others, and these need to be addressed in this section.
266	8.1.1.4	8-4	Sediment effluents will contain PCBs. Explain what will occur should a release of PCBs to the water body occur. Other sites regulated under NPDES agreements have not allowed any releases. Not allowing barge dewatering at the dredge site would significantly impact production. Add a discussion of this issue to this section.
267	8.1.1.5	8-5	These predictions have changed/accelerated over the last decade - update the projections if possible to reflect more recent information. Area/viability of mudflats for clamming will be greatly affected by sea level rise and thus will not affect all alternatives equally. Add this to the discussion.
268	8.1.1.6	8-5	Summarize what the neatline dredge depths are for each area. Explain the uncertainty (e.g., 95th percentile of depth range) allowed to address minimization of missed inventory.

Comment #	Section #	Page #	Comment
269	8.1.1.6	8-6	Paragraph 1: Explain what the assumed neat line depth of contaminated sediments in intertidal areas is.
270	8.1.1.6	8-6	Paragraph 2: The TIN is not a constructible boundary; some methods of smoothing/averaging are going to be required. State this here.
271	8.1.1.6	8-6	Paragraph 3: Dredging only to 5 ft for cap placement may not allow for an over dredge allowance. Discuss this.
272	8.1.1.6	8-6	Paragraph 4: Existing bathymetry already shows a depression where the cable crosses the EW, such that pre-dredging may not be required. A sub-bottom sonar survey of the cable areas as well as the toe of slope for riprap areas may be needed to determine current burial depth. Discuss this in this section.
273	8.1.1.6	8-6	Paragraph 5: These jet probe data have not been previously mentioned. Discuss the study and results in an appendix, and summarize here. Revise “and jet probe data” to state “using jet probe data”.
274	8.1.1.6	8-6	Paragraph 5: How was it determined if riprap contained soft sediments or not? If present, hydraulic dredging would remove sediments and would be a significant volume when extrapolated over the entire site.
275	8.1.1.6	8-6	Last paragraph: The estimates of underpier area that exceeds RALs need to be recalculated after inclusion of the Coast Guard Pier 36 surface sediment data. While the number of Thiessen polygons that will change is very small, it is nevertheless important that the figures (and estimates based on these figures) reflect the best available information.
276	8.1.1.7	8-7	Paragraph 1: Explain the technical basis for assuming 9" of residual management cover.
277	8.1.1.7	8-7	Paragraph 1: Indicate that the backfill volume is the same as the in-place dredging volume, less bulking factor.
278	8.1.1.7	8-7	Paragraph 1: Explain if dredging adjacent to a cable line would not be allowed over concerns of destabilization (same as for toe of slope for riprap areas).
279	8.1.1.7	8-7	Paragraph 1: Clarify that 18 inches is the expected maximum depth of prop wash scour.
280	8.1.1.7	8-8	If the BAZ is 10 cm, explain why a 3" cap is considered protective.
281	8.1.1.8	8-8	Clarify that the fish window applies to the EW OU.
282	8.1.1.8	8-8	This is the first use of the construction windows concept; explain why this time restriction is being applied. Also explain if some areas such as slips will be partially exempt (activity specific) if area use for fish migration/spawning could be prevented or assumed to be negligible.
283	8.1.2.1	8-9	Mechanical Dredging: Indicate barge capacity, number of barges, and approximate turn-around time.
284	8.1.2.1	8-10	Per previous comment, a sub-bottom survey indicating toe of slope location would help reduce this uncertainty. Add possibilities of this in this discussion.
285	8.1.2.1	8-10	Diver-assisted Hydraulic Dredging Under Piers, paragraph 1: Note in this section that there are also significant mobilization costs, including separate safety plans and check-out dives to demonstrate competency and feasibility of technical approach.
286	8.1.2.1	8-11	Paragraph 1: Note that the residuals include the undredged material not meeting RALs.
287	8.1.2.1	8-11	Paragraph 2: Indicate that the actual RMC area will be determined by monitoring conducted during the post-dredging phase.
288	8.1.2.1	8-11	Paragraph 2: Note, in this section, that the RMC layer would act as a habitat enhancement layer.
289	8.1.2.2	8-12	Paragraph 1: Note, in this section, that residuals management using RMC is unnecessary since a cap will be applied.
290	8.1.2.3	8-13	Paragraph 1: See previous comment requesting explanation as to why 3" treatment with AC is sufficient (Comment #280).
291	8.1.2.3	8-13	Paragraph 2: Quantify what % reduction was assumed for economy of scale.
292	8.1.2.3	8-13	Paragraph 3: Specify total potential acreage of underpier areas.
293	8.1.2.3	8-13	Paragraph 3: Indicate how this 2.3-ft average neatline depth is calculated (i.e. average of minimum and maximum depths).
294	8.1.2.3	8-13	Paragraph 3: “…(costs…” Remove parenthesis and begin new sentence.
295	8.1.2.4	8-14	Restate that the allowance for overdredge may be required to ensure the underlying cap is not disturbed.
296	8.1.2.5	8-15	State what the potential exchange rates are (e.g., cy/yr) and how they relate to contaminant concentrations over time – explain if this process of scouring/mixing will eventually dilute the under pier sediment concentrations.
297	Table 8-1	8-22	a) In the top row, add a bullet/hyphen for each of the CMAs to differentiate them easier (vs. CMA names that cross onto a second line) b) The Junction Reach CMA is shown under both the Navigation Channel and Shallow Main Body areas. Remove the incorrect one. c) CMA T-25 Nearshore is missing from this table. Add where appropriate.
298	Table 8-2	8-23	Explain why removal-only is satisfactory for PCBs, but PAHs need to be addressed by in situ treatment.

Comment #	Section #	Page #	Comment
299	8.2.2 & Table 8-3	8-23, 8-24	a) Table 6-2 is referenced twice in this section (second sentence and Table 8-3), but Table 6-2 does not exist. Correct reference. b) Verify that the reference to Section 6.2.2 is accurate (seems that it should be Section 6.2).
300	Table 8-5	8-26	a) Incorporate same comments for Table 8-1 (Comment #297). b) For the CMA list for the 'Sill Reach - Low Bridges', add the Railroad Bridge CMA. c) The sixth line of alternatives shows "2B(12)"; revise to be "3B(12)".
301	8.2.5 to 8.2.13	8-27	The acres of "removal - open water" in these sections in Chapter 8 are not consistent with other places in the FS. It appears that some are rounded and some are adjusted to total to 157 acres. Revise so they are consistent.
302	8.2.9	8-33	Typo in the third paragraph: "The alternative has the same construction timeframe (~~9~~10 years) as Alternative 2B(12)…"
303	Ch 9	General	There needs to be more discussion about how alternatives utilizing active remediation will reduce contaminant concentrations more quickly and with greater certainty than those relying on natural recovery.
304	9.1.1.2	9-5	First full paragraph of the page: Consistent with Comment #2 remove reference to complying with MTCA/SMS once regional background levels are established.
305	9.2.4.1	9-25	Surface sediment bullet: add that the 470 value is for total PCBs.
306	9.3.1	9-28	Percentage reductions in sediment contaminant concentrations must also be noted. This is particularly important because target risk based concentrations cannot be attained.
307	Table 9-1	9-29	Include a note indicating that inputs from the LDW and lateral sources and migration of contaminants from under pier areas would likely be the cause of PCB and dioxin/furan concentration increases post-construction.
308	Table 9-2	9-30	As was done with Table 9-3, shade the cells that achieve the PRG.
309	9.3.1	9-33	Third dash on this page, revise to: "…SWACs for arsenic and cPAHs show an ~~slight~~ increase when comparing…" For arsenic the increase is nearly 3x, and for cPAHs it is 4-9x increase - these seem more than "slight."
310	Table 9-4	9-36	Explain why only the baseline tissue UCLs on the concentration term are provided. Since the modeled concentrations are means, doesn't it make more sense for mean baseline data to be provided?
311	9.3.3.1	9-38	Indicate the percentage reduction in risk, which appears to be significant. This is particularly important because target risks not be attained.
312	9.3.3.1	9-39	Add a footnote that briefly explains the difference between HQs and HIs, and what an acceptable HI vs HQ value is. Alternately, this could be included in the definitions section in Chapter 1.
313	Table 9-5a	9-40	Include a note indicating that inputs from the LDW and lateral sources and migration of contaminants from under pier areas are the cause of lower initial child tribal RME cancer risks being lower than those associated with later time points.
314	9.3.3.2	9-44	The footnote indicates that post-remedy HQs were not calculated for direct exposure scenarios because baseline conditions were <1 (within the acceptable range). However, other influences (e.g. upstream sediment) could increase these values post construction, as was seen with the individual excess cancer risk (Table 9-6a). Provide further justification for why these HQs were not included.
315	Table 9-6a	9-45	Include a note indicating that inputs from the LDW and lateral sources and migration of contaminants from under pier areas are the cause of increasing post-construction risks.
316	9.3.4	9-47	The second full paragraph (at the bottom of the page) describes why two TRVs are used. Move this to the beginning of the section to clarify this for the reader sooner.
317	Table 9-7	9-48	For the values listed as "<1.0", include the actual value (as was done for Table 9-5c).
318	9.4.1	9-49	In the third paragraph, the references to Tables 9-1 and 9-2 seem incorrect. Appears it should reference Table 9-8. Verify and correct.
319	9.X.1 (X= 4-13)	9-49, 59, 72, 83, 95, 106, 118, 129, 138, 151	Identify the percent reduction in risk for seafood consumption. There will be a significant improvement, even if target risks cannot be attained.
320	Table 9-8	9-54	Construction will take 9-13 years, depending on the alternative selected. Many evaluation metrics are achieved at time "0", which is immediately post-construction. The time to achieve evaluation metrics would, presumably, occur sometime during this construction.

Comment #	Section #	Page #	Comment
			However, the table assumes that metrics will not be achieved until the end of construction. To the casual reader (who might skip the text and go straight to the Table), it therefore seems like longer construction period alternatives take longer to achieve these metrics than shorter construction period alternatives. This is somewhat misleading. It seems that a better way to describe “time to achieve metrics” can be devised so that it doesn’t make it appear (in the table) that shorter construction period alternatives somehow achieve these metrics sooner than longer construction period alternatives.
321	9.X.5.3 (X = 4-13)	9-56, etc.	In the paragraph following the bullets, indicate that the 7 mg/kg is for arsenic (arsenic is not mentioned until the end of the paragraph).
322	9.X.2 (X = 5-13)	9-60, etc.	Consistent with Comment #2, remove references to complying with MTCA/SMS once regional background is established.
323	Table 9-10	9-64	Indicate 'out of how many cores' for each table cell. Particularly since several of the zeros are actually zero out of zero.
324	Table 9-10	9-64	Based on the figures in Appendix H, several of these values seem incorrect. Verify and correct all values in the table. Below are a few discrepancies seen based on a spot-check: a) Partial dredging and capping, for 1A(12), 1B(12), and 1C+(12) [Figs. 2a/b/c], for >CSL: counted 9 not 8. b) Partial dredging and capping, for 1A(12), 1B(12), and 1C+(12) [Figs. 2a/c/b], for >RAL/SQS and <CSL: counted 7, not 13. c) No Action, for 2C+(7.5) [Figs. 5a/b/c] and 3E(7.5) [Figs. 6 a/b/c], for >CSL: counted 2 cores (S11 and S16), not 0. d) No Action, for 2C+(7.5) [Figs. 5a/b/c] and 3E(7.5) [Figs. 6 a/b/c], for >RAL/SQS and <CSL: counted 5 cores (S01, S20, S47, S13, S18), not 0. Update any related discussion of contamination remaining based on revisions to this table.
325	9.8.3.1	9-98	Correct the typo: "...8 and 13 respectively; one core greater than CSL and two cores greater than RAL/SQS…"
326	9.9.3.1	9-109	Correct the typo: "...8 and 13 respectively; one core greater than CSL and two cores greater than RAL/SQS…"
327	9.9.5.2	9-112	In the first paragraph of 9.9.5.2, there is a reference to "Alternative 5" which does not exist anymore; correct.
328	9.14.1	9-162	Correct the typo in the last paragraph: "Figures 9-7a and 9-7b…".
329	9.15.1.2	9-167	Correct the typo in the first full dash/bullet: "…results in a slightly greater change ~~on~~in predicted SWAC…."
330	9.15.2 & Appdx J, Sect 5.1.3	9-170 & 46 in Appdx	Recovery of the LDW sediment bed (decreasing LDW SWAC with time) is not included in any of the EW sensitivity analyses. It was not included because the percent of LDW bed sediment that enters the EW is small. Somewhere in the FS, it needs to be mentioned that it is reasonable to assume that recovery of the LDW sediment bed will have little effect on EW SWAC or point concentrations. A same argument can be made for LDW lateral loads.
331	Table 10-1	10-2 to 10-7	Consistent with Comment #2, remove references to compliance with MTCA/SMS once regional background is established.
332	Table 10-1	10-2 to 10-7	The following comments regarding the star ranking system need to be addressed: a) The long-term effectiveness ratings are biased high, particularly given that, although risk is reduced, none of the alternatives actually meet EPA’s risk thresholds. More emphasis needs to be given to overall risk levels achieved, not simply if risk is reduced. b) For the permanence categories given to each technology for long-term effectiveness (e.g. Table 11-1), it is confusing to use “highly permanent” as the middle category. This need to be revised to “moderately permanent”. In addition, it is EPA’s experience that in situ treatment is a moderately permanent technology, not a less permanent as shown in Table 11-1. The permanence calculations need to be revised to include in situ as moderately permanent. c) For short term-effectiveness, although it is important to capture environmental impacts, by including landfill capacity consumption, energy consumption, air emissions, carbon footprint, etc., the environmental impacts become disproportionally emphasized. Environmental impacts need to be condensed and simplified into a single metric that is proportional to the overall environmental impacts. EPA believes that ‘total volume removed’ is appropriate to use as this metric, as it captures the overall size of the alternatives, and is the common factor dictating the magnitude of the other environmental impact metrics evaluated.

Comment #	Section #	Page #	Comment
			d) Section 10.2.3 needs to better describe what emphasis was given to diver assisted hydraulic dredging versus other categories evaluated. It appears from the star rakings that diver dredging may have been over emphasized, particularly for the alternatives that only include 2 years of diver dredging, but the description is insufficient to fully understand what influence this metric had. e) For short-term effectiveness, Section 10.2.3.4 needs to be clearer about the ranges applied to each category. For example, for removal "moderate impacts" were first described as 910,000-960,000 cy, then "lower impacts" were described as 820,000-960,000 cy, and then "least impacts" were described as 810,000 cy. These ranges overlap and are not proportional. The ranges for removal and the other metrics, need to be revised to better represent the range of alternatives and clearly define what low, medium, and high are. f) For Implementability, EPA considers diver-assisted hydraulic dredging to be moderately implementable. The description in Section 10.2.4.1 currently describes diver dredging as having "large technical challenges" and implies that it has low implementability. This description and the corresponding rating need to be revised to reflect moderate implementability for diver dredging. g) For cost, the description in Section 10.2.5 needs to clearly state how the cost ranges for each star level were determined.
333	Table 10 -1	10-2	For 'Overall Protection' rows (first four rows), it is confusing to intermix comparisons to PRGs and risks. As this section is about "magnitude and type of residual risk", it needs to primarily discuss residual risk. If a PRG needs to be discussed in addition, state the basis for the PRG (e.g.10^{-6} cancer risk, HI of 1, background).
334	Table 10-1	10-2	Correct the following excess cancer risk values for 'Overall Protection' for RAO 1 (first row), to be consistent with Table 9-5b: a) For the No Action alternative: "...excess cancer risk of 45 x 10^{-4} (Adult Tribal RME), ~~8~~9 x 10^{-5} (Child Tribal RME)..." b) For the other alternatives: "(Adult Tribal RME), ~~3 to~~ 4 to 5 x 10^{-5} (Child Tribal RME,.."
335	Table 10-1	10-2	Correct/clarify the following for HQ values for 'Overall Protection' for RAO 1 (first row): a) For the No Action alt.: "...and 9~~ x 10^{-4}~~ (Adult API RME)." b) For the other alternatives: Clarify that the presented HQ values are for the total PCBs immunological endpoint only (which are the highest among the three scenarios in Table 9-5c).
336	Table 10-1	10-2	For the 'Overall Protection' for RAO 3, action alternatives (third row): because Alt 1A(12) has different results from the other alternatives, use a separate column for 1A(12) (similar to the row for 'Compliance of ARARs', MTCA/SMS, RAO 3).
337	Table 10-1	10-3	For the 'Compliance with ARARs' MTCA/SMS rows: it seems incomplete to not include RAO 4 along with the other RAOs. Include, or add a footnote indicating why it is not included in the table.
338	Table 10-1	10-5	For the rows 'Time to Achieve RAOs' RAO1: it is unclear why there are two API scenario versus one each for the adult and child tribal scenarios. Revise for consistency, or add note indicating reason.
339	Table 10-1	10-5	For the rows 'Time to Achieve RAOs' RAO1: clarify why the adult tribal and child tribal scenarios are evaluated against different risk thresholds (10^{-4} vs 10^{-5}).
340	Table 10-1	10-5	Consistent with Comment #9, the time to achieve RAO 2 needs to reflect the fact that the PRGs and risk do not continue to be met following year 0 or 5.
341	Table 10-1	10-5	For the row 'Time to Achieve RAOs', RAO2, cPAHs, clamming areas (fourth row from bottom): based on Table 9-2, the No Action alternative does not achieve the clamming PRG for cPAHs (at year 40 the SWAC is 166 and the PRG is 150); Table 10-1 currently shows 20 years to achieve for the No Action alternative. Correct this value to "Does not achieve".
342	10.1.1.1	10-8	Based on Table 9-5b, revise the following in the last line of the page: "…Adult Tribal seafood consumption RME scenario, ~~3~~4x10^{-5} for the Child Tribal seafood consumption…"
343	10.1.1.1	10-9	Based on Table 9-5b, revise the following in the first (partial) paragraph: "Alternative 1A(12) is predicted to achieve 3x10^{-4}, 45x10^{-5}, and 1x10^{-4}…."
344	10.1.1.1	10-9	Only RAO 1 is discussed in this section. Include narrative for the other RAOs.
345	10.2.1 and sub-sections	10-14 to 10-23	For evaluation of long-term effectiveness, the FS includes a qualitative analysis of vulnerable inventory left behind. However, a quantitative analysis would be much more beneficial to the reader. The authors state that the EW has potential for propwash to mix sediment to a depth as much as 5 ft. EPA considers this remaining mass a relevant factor when evaluating long-term effectiveness and permanence of various remediation alternatives. Explain if it is possible to extract such data (mass of contaminant that remains "vulnerable") from the box model output coupled with TIN-based contaminant mass removal analysis (Appendices H and F). If such a

Comment #	Section #	Page #	Comment
			calculation can be made, it would be a helpful quantitative method to compare alternatives for long-term effectiveness. Buried contaminant inventory has the potential to effect SWAC well past the 30 year simulation period. Therefore, it is necessary to quantify the buried contaminant mass vulnerable to propwash for each remediation alternative.
346	10.2.1.2	10-20	Correct the typo: "The scope and duration of monitoring are similar for ~~that~~the action alternatives."
347	10.2.3.3	10-28	The second sentence for RAO 2 appears to be an incomplete sentence/phrase. Revise as necessary.
348	11.1	11-3	The description of the Figure 11-1 dots ("full red dot" and "full black dot") are not consistent with the current figure. Correct.
349	Table 11-1	11-4 to 11-5	Consistent with Comment #2, remove references to compliance with MTCA/SMS once regional background is established.
350	Table 11-1	11-5	a) For Time to Achieve RAOs, the timeframes given are not consistent with the timeframes given in Table 10-1 which shows that PRGs and some risk reduction for RAO 1 are not predicted to be achieved within the 40-year modeling range. Add this information to this section. b) In addition, consistent with Comment #9, the timeframes need to reflect that PRGs and risk for RAO 2 do not continue to be met following year 0 or 5.
351	11.1.1	11-6	Based on Table 9-5b, revise the following in the second paragraph: "…. ~~3 or~~ 4 or 5 x 10^{-5} from the Child Tribal seafood consumption RMC scenario…"
352	11.3	11-20	The uncertainty discussion needs to include language describing that in situ treatment of underpier hot spot areas poses more uncertainty versus removal. These hot spot areas pose a greater threat to potential recontamination and not achieving SWACs. However, because of their small area compared to the full waterway, this impact cannot necessarily be fully captured in the alternatives ranking analysis.
353	Figure 11-2		Incorporate same comments from ES Figure 10 (Comments #89-91)
354	Appdx A, Part 1	All	When discussing PCBs be clear that it is total PCBs.
355	Appdx A, Part 1	All	Include EPA's natural background values (95UCL from the Bold data set) along with the Ecology/SCUM II values.
356	Appdx A, Part 1; Sect 1	2	Consistent with Comment #2, remove reference that "…alternative will likely comply with SMS requirements…once regional background levels are established…"
357	Appdx A, Part 1; Sect 2	4	Consistent with Comment #190, revise the PCB background value to be consistent with the current (2015) version of SCUM II.
358	Appdx A, Part 1; Sect 3	5	The second paragraph states "RBTCs associated with CSL (excess cancer risk of 10^{-5}…) are presented in FS Table 4-4…" Table 4-4 does not strictly show the 10^{-5} cancer risk value. Revise this statement to reflect what is actually shown in Table 4-4.
359	Appdx A, Part 1; Sect 3	5	See Comment #2 regarding regional background. Revise the statement in the second paragraph "Because regional background includes impacts from stormwater and other diffuse sources, regional background will be higher than the SCOs for PCBs and dioxins/furans."
360	Appdx A, Part 1; Sect 3	6	Consistent with Comment #2, remove reference that the CSL will be based on regional background concentrations.
361	Appdx A, Part 1; Sect 3	6	It is stated at the end of the first (partial) paragraph: "However, in the absence of regional background concentrations, the CSL has not been established for total PCBs or dioxin/furan." Regional background is not the only method by which an upper tier CSL is developed based on MTCA. A risk-based concentration and the PQL needs to also be taken into consideration. Explain why these were not included.

Comment #	Section #	Page #	Comment
362	Appdx A, Part 1; Sect 4	7	A technicality, but the rules for upward adjustment of the SCL described in Section 4 only apply to upward adjustments that remain below the CSL (Section iii of the WAC code). It's really at this point that the PRG deviates from SMS. Add this to the discussion.
363	Appdx A, Part 1; Sect 4.1.2	13-14	When discussing data from Elliot Bay, briefly describe the difference between "inner" and "outer" Elliott Bay (i.e. where is the division line?).
364	Appdx A, Part 1; Sect 4.3	16	Paragraph 2: This statement indicates that "when considering all these areas together" achievable PCBs cleanup levels (site-wide SWAC) is 57 ug/kg dw when considering areas near structures. This value is much lower than that reported as "achievable concentrations for all lines of evidence" of 153 ug/kg dw (Page 16 Paragraph 3). Clarify the apparent discrepancy.
365	Appdx A, Part 1; Sect 6	19	Consistent with Comments #1 and #2, remove reference that SMS will be achieved with establishment of regional background or an SRZ.
366	Appdx B, Part 1; Sect 2	3	Waves due to ship wake may reflect off riprap or otherwise be trapped under piers to significantly magnify the potential erosional sources ("currents due to ships"). This scenario was apparently not addressed due to PTM model limitations. Describe the potential impact this transport pathway could have?
367	Appdx B, Part 1; Sect 3.3	9	Change to "lateral".
368	Appdx B, Part 1; Sect 3.3	9	Although seemingly obvious to most, the term "lateral" needs to be defined (i.e., "points of potential release entering the EW along the length of the channel").
369	Appdx B, Part 3A; Sect 2.1.3	6	Expand (with references to sources) upon impacts to post-construction SWAC values for having 50% loss. Explain if SWACs of the final residuals are limited to one-half of the redredged material concentration. This is a significant limitation of a one-pass removal, and raises whether second-pass or no-pass/capping is the appropriate approach to address the problem.
370	Appdx B, Part 3A; Sect 3	12	Explain how the 2.3 ft thickness estimate for under pier areas was derived. Were depth to riprap surveys conducted? How does depth uncertainty impact this estimate?
371	Appdx B, Part 3B; Sect 3.1	5	The end of footnote 3 indicates that finer particles tend not to settle in the EW and LDW. However, in other places it indicates that little coarse grain particles enter EW and the most if it is fine-grained. These two ideas aren't consistent considering net sedimentation is occurring. Revise the various discussions as appropriate to make the overall sedimentation concept consistent.
372	Appdx B, Part 4; Sect 5	14	Correct the typo in the second sentence: "Current conditions for modeling purposes was defined as now through…."
373	Appdx B, Part 5; Sect 2.1	3	Issue of "missed inventory" needs to be highlighted as a key factor to achieving the SWAC goal.
374	Appdx B, Part 5; Sect 3.1.2	14	In the second paragraph, the statement "Silt curtains could actually increase the quantity generated by concentrating suspended solids," is confusing. Silt curtains don't affect how much is generated from dredging, only where it settles out. It would be more accurate to say that it affects the area over which settling occurs, thereby potentially affecting the depth of the settled residuals layer.
375	Appdx B, Part 5;	19	The end of the first paragraph indicates RMC may be placed either at the end of each year or the end of all dredging. The calculations, which are consistent with previous discussions, only represent RMC placement after all dredging is complete. Revise this sentence in Sect 3.2.2 to be consistent.

Comment #	Section #	Page #	Comment
	Sect 3.2.2		
376	Appdx B, Part 5	Table 4-1, pg 20	There are three blank rows in the fourth section. Remove rows or explain why they are blank.
377	Appdx B, Part 5; Sect 5	26	Revise reference to Section 2.3, Paragraph 1 for description of “interior unremediated islands”.
378	Appendix C	General	It’s stated that OC normalized concentrations can’t be interpolated using IDW. Explain why this is. The assumption is that TOC and PCBs may not have been collected at the same locations, meaning some samples wouldn’t be included in the IDW interpolation. If this is the case, the same issue would be present for the Thiessen method used in Section 6 of the FS. It is unclear why not being able to interpolate OC normalized concentrations was a deal-breaker for IDW, but not the Thiessen polygons. Provide an explanation as to why this is the case.
379	Appdx C; Sect 3.1	7	Describe the sampling design that would be employed/suggested to support the remedial design. Also, little description of the subsurface contaminant distribution (by either Thiessen polygon or IDW methods) is provided. Explain what the neat line looks like in light of these present results.
380	Appdx C; Sect 3.2	8	It is stated that "…1) this matrix interference only occurs in a few samples," but this is the only time that a 'matrix interference' is described in the whole Appendix. Add a discussion of what this interference is, or remove this sentence.
381	Appdx D; Sect 2	2	Specify what the model is (CapSim, steady state), and the current version (e.g. CapSim v1.12, 2012). Is the BAZ layer mixing included in the model? If not, what mixing rate is assumed?
382	Appendix D, Section 3	4	Justify use of average concentrations and verify that the contamination layer in contact with the cap is typically used as the best source estimate of potential contaminant migration.
383	Appdx D	Table 1	It is unclear how the 'contaminant concentration in sediment' (8th row) was determined. The values chosen are indicated as maximums, but do not appear to be the maximum values presented in FS Table 2-1 or the SRI. Correct, or explain why these values are different from the Table 2-1/SRI data.
384	Appdx D; Table 2a		This Darcy velocity is not particularly high, being 20X + lower than that used for the intertidal condition. Explain if uniform groundwater flow conditions exist across the site. Also explain the uncertainty of using the literature values (Fabritz, 1998) versus site-specific data for estimating Darcy velocity.
385	Appdx D; Table 3		The selected PAHs exclude lower Koc compounds (i.e., naphthalene with log Koc of 3.3), which will greatly increase the prediction of vertical migration and potential break through. This would also apply to specific carcinogenic PCB congeners as well. Discuss this uncertainty of using high Koc compounds as it relates to potential breakthrough and surface concentrations above the cap.
386	Appdx D, Attach. 1; Figure 1-1		This figure is lacking a legend to explain the boundaries being displayed. Revise.
387	Appdx E; Sect 2.2	5	Diver-assisted dredging costs are a key factor in the comparison of remedy options. Provide some detail on costs of other projects. If this is done infrequently, lack of experience needs to be factored into the cost uncertainty.
388	Appdx E; Sect 2-4	7	Contingency remediation is stated as 10% of MNR, ENR, and in situ areas. Chapter 8 and Appendix E Table 1 uses 15%. This needs to be corrected.
389	Appd E; Sect 4	11	Explain if costs associated with “weather days” or down time for equipment maintenance and repair are captured.
390	Appd E; Sect 4	11	State if the costs of sampling in support of the remedial design are included in the overall estimate.
391	Appd E; Sect 4	11	Elaborate how fisheries migration can impact costs beyond the fish windows remobilizations already assumed. Explain if this is possibly related to marine mammal restrictions.

Comment #	Section #	Page #	Comment
392	Appdx E	Table 1	The Unit Cost Notes for Item 1a indicate "…approximately 20 days mobilization and 15 days mobilization…" It would seem one of these needs to be demobilization; correct as needed.
393	Appdx E	Table 1	Make sure the "TM" is superscripted on all of the "AquaGate+PAC™".
394	Appdx E	Table 1	For item 3e (Transload, Transportation and Disposal), based on the description it appears that transportation from the rail facility to the landfill is not included. Include, or explain why it is not needed.
395	Appdx E	Table 5	The shaded rows (subtotals & totals) are missing values. Add these values.
396	Appdx F; Sect 2.4	7	Explain what volume contingency is reserved for volumes associated with constructible dredge prisms.
397	Appdx F; Sect 2.4	7	Explain how often the maximum depth of RAL exceedance was not captured. Explain what effect this has on the volume uncertainty.
398	Appdx F; Sect 2.4	7	Explain how slumping sediment adds to the removal volume.
399	Appdx F; Sect 2.4	7	This constructability factor is presented as a multiplier of sediment volume for remedial volume estimation (and cost estimation). This is a major source of uncertainty and requires a more detailed analysis for the EW than simply referencing past project experience for validation.
400	Appdx F; Sect 4	10	Explain where the additional 1 ft of contamination assumption is presented, and how is it justified. If current composite core lengths are 4 ft or greater and contaminated layers could extend 3 ft or more (but masked by blending). State this here.
401	Appdx F; Table 2		Explain if an overdredge allowance has been included in the calculation.
402	Appdx F	Figures 2a, 2b, 3a, 3b	Correct the matchline figure reference (currently references Figures 1a and 1b)
403	Appdx F	Figures 4a, 4b	Correct the matchline figure reference (currently references Figures 2a and 2b)
404	Appdx G	2	Both O&M monitoring and long-term monitoring are described as "measure post construction and long-term performance," and both occur during the 20 years post-construction. Clarify how these types of monitoring are different.
405	Appdx G	3	For Section 3, state that the cost is assumed to be similar to O&M years 5, 10, 15, and 20. (This was stated in Table 1, and similar statements were made for other sections; it needs to be consistent here too).
406	Appdx G	4	First bullet: clarify what kind of daily surveys are being referenced. Bathymetric?
407	Appdx G	4	Fourth bullet: clarify what "payment surveys" are; this is not a common term.
408	Appdx G	5	Table 1 shows that Year 3 sampling is significantly different than the other years. Briefly explain in Section 5 why this is.
409	Appdx G	5	The last sentence references physical inspections. Is this referring to inspections by a diver? If so, this needs to be clarified as diver operations are a significant cost.
410	Appdx G; Sect 6	6	The original baseline data set was based on 4-ft core composites. Within that layer, individual horizons exceeding the RAL could exist, especially in the BAZ, which could greatly underestimate risks. Explain how this potential exposure would be monitored after the remedy is complete. Also see comment above on Appendix F, Section 4, page 10 (Comment #400).
411	Appdx G	Table 1	Surface water sampling is presented in the table, but not discussed in the narrative sections. Add a narrative where appropriate.
412	Appdx G	Table 1	Footnotes: Explain why some PCB analyses are listed as Aroclors and others as congeners. Clarify why different methods are assumed (or remove if assumption isn't necessary for the conceptual detail in this appendix).
413	Appdx G	Table 1	If PCB methods are retained (see previous comment), clarify in footnote (b) which is assumed.
414	Appdx H	General	This section presents the core results for subsurface sediments but does not discuss the distribution or otherwise present Thiessen polygon or IDW results to understand the potential distribution. Add a results section and elaborate further on the overall patterns.
415	Appdx H	Figures 5a & 5c	The coloring for core EW10-SC31 is not consistent with the analogous maps for the other alternatives. It appears the bottom half (below the hatching) needs to be green, not yellow. Verify and correct.

Comment #	Section #	Page #	Comment
416	Appdx H; Sect 2	5	Consistent with Comment #224, the description of the seven excluded cores needs to be expanded upon to explain why they are not appropriately representative. The revised description in Section 6.1.2.1 can be referenced, if appropriate. Also, it is indicated that seven cores were excluded, but eight cores are listed; revise.
417	Appdx I, Part 1; Sect 4	13	The discussion of efficiency of train, truck and barge is confusing. First, "gallons" is not an efficiency - a more appropriate efficiency calculation would be gallons/mile/ton. Also, the total gallon calculation represents transport of different material. These values should not be compared. It is expected that transporting something only 20 miles would require less fuel than transporting something 284 miles, no matter what the transportation method is. Provide clarification of what this efficiency calculation is meant to represent, and how it helps with decision making.
418	Appdx I, Part 1	References & Tables	Nearly all of the websites given in the references are out-of-date. Update as necessary.
419	Appdx I, Part 1	Table 1	The note (4th column) for Tug Boat (first row) is confusing. It indicates that it will take 4 hours for mob and 4 hours for demob, but then says 8 hrs/day for 35 days each season - these are significantly different. Appendix E indicates 20 days mob and 15 days demob which is consistent with the 35 days/season. Delete or clarify what the 4 hours vs. the 8 hours are meant to represent.
420	Appdx I, Part 1	Table 1	The notes are generally confusing when it is stated "assume one X hr shift". It sounds like only one shift of only X hours is required to complete the entire task. Clarify that this is per day/week/etc.
421	Appdx I, Part 1	Table 4	Correct the typo in the sixth row: "CO2 emission factor for ~~boats~~ truck"
422	Appdx I, Part 1	General	Change units of "kWh/hour" to simply "kW".
423	Appdx I, Part 1	Table 9	Suggest removing the Notes column; it is already presented in Table 1 and doesn't impact the interpretation of the results being presented in this table. If retained, incorporate the same comments from Table 1.
424	Appdx I, Part 1	Table 9	The in-table footnote references need to be updated. For example, the reference for "Tug Boat (800 HP)" needs to be 4 not 2.
425	Appdx I, Part 1	Tables 9 & 10	In the footnotes, the conversion of metric tons to grams is given as "10E-6" but it must be "1E-6". Edit, and ensure the calculations used the correct conversion factor.
426	Appdx I, Part 1	Table 11b	In the chart below the table, the colors are difficult to differentiate. Use more distinct colors/patterns.
427	Appdx I, Part 1	Table 12	Scale the size of the pie charts relative to the total CO2 emissions.
428	Appdx I, Part 1	Table 13	Revise the typo in footnotes c, d, and e: "Emission rate~~s~~ utilized is…"
429	Appdx I, Part 2; Sect 2.1	3	While air pollution is generically addressed and there is a lack of typical problematic contaminants (i.e., NAPL) presence of hydrogen sulfide has been observed such that there may be a need for an application of odor control technology (e.g., foam cover application) that may/may not be required during the dredging process or rail/truck transport. Address and revise this section as appropriate.
430	Appdx I, Part 2; Sect 3.1	7	The conclusion "Therefore, rail and barge transport are the most efficient way to reduce transportation impacts" does not follow the previous discussion. The discussion simply says that transport by truck is a large part of transportation. Sometimes the best way to efficiently reduce impacts is to slim down the biggest one. This statement needs more explanation or needs to be removed.
431	Appdx J; Sect 2.2.1	13	The referenced Figure 2 provides an ideal mix of cleanup approaches to address various areas exceeding the RAL, but the approach is likely too complex to be constructible. Explain if further analysis of these maps has been performed to produce constructible areas (and associated sediment volume estimates, costs, etc.).
432	Appdx J; Sect 2.2.2	13	The equation needs to indicate "Average Incoming Solids Concentration".

Comment #	Section #	Page #	Comment
433	Appdx J; Sect 2.3	21	In the second paragraph the reference to Section 2.4.1, needs to be Section 2.3.1.
434	Appdx J; Sect 2.3.2.1	23	Underpier areas are cited as having higher concentration sediments, and lateral exchange of particulates may be a significant source of COPCs to the main channel areas. Add information that exists as to source characterization, i.e., fingerprinting, in order to assess whether this proposed transport pathway is complete.
435	Appdx J; Sect 2.3.2.2	24	Reduction in bioavailability due to in situ treatment is cited as the most sensitive site performance parameter; 70% reduction is selected as the quantitative response to be achieved. A lack of site-specific direct measurement via treatability studies is a significant data gap. Add references to back up this estimate.
436	Appdx J; Sect 2.3.2.3	25	As noted in Comment #434, chemical source characterization to identify Green River sources versus local sources on total chemical concentrations to be achieved post-construction needs to be conducted.
437	Appdx J; Sect 3.1	31	This section notes that amounts of sediment from different sources vary by point location. Describe what information exists regarding source chemistry (i.e., chemical composition also varies by point location). Quantify this assumption for use in source control/recontamination.
438	Appdx J; Sect 3.1	31	This section discusses underpier mixing and draws the assumption of fully mixed sediments. Radiological dating of core profiles was performed at many locations and the presence of the Cs-137 peak indicates a lack of vertical mixing. Explain if this information can be used to derive more technically supportable estimates of vertical mixing extent.
439	Appdx J; Sect 3.1	31	Correct the typo: "…we derived from sampling conducted between 2001 and 2009, as shown in Figure ~~5~~6."
440	Appdx J; Sect 5.1.4	47	This section states that catch basin sediments may not be representative of what is discharged through the outfall. Explain if this uncertainty has been evaluated, i.e., whether distinct chemistry sources exist due to local chemical releases reflective of site-specific releases.
441	Appdx J; Sect 5.1.6	50	This section notes that actual undredged sediments that are part of the new surface chemistry may exceed the cleanup goal. Unlike the dredge residuals, the thickness of this layer is unknown and may be a far more significant recontamination source if disturbed than the dredge residuals. Explain if any analysis of spatial variability has been conducted to assess whether this is likely to occur. Lines of evidence would include isolated cores having a deep layer of contamination, and whether distributions (chemical contours) are uniform or sporadic. See comment on Appendix H, Remaining Subsurface Contamination, Section 3, Results.
442	Appdx L; Sect 3.1.2	9	The text states that dredging is the primary remedial technology because of navigational depth requirements. This is not entirely accurate. The purpose of the remedial action is to reduce risks, not to achieve navigational depth goals which are important but not principal to meet PRGs. Deeper dredging would reduce propwash forces that may resuspend COCs, hence is a remedial technology for that reason. Clarify the technology selection goals.
443	Appdx L; Sect 3.2	12	Explain if an analysis has been performed on disposal costs based on reuse of sediment as daily cover versus solid waste.
444	Appdx L; Sect 3.2	12	Explain if there are presently disposal sites available with the required capacity and permit to accept such a high volume of material.
445	Appdx L; Sect 3.2	13	Explain if sediment removal from riprap surfaces is part of or excluded from the underpier remedial action for technology using diver-assisted hydraulic dredging. Figures 2-1 through 2-16 (in this appendix) indicate riprap is a no action area.
446	Appdx L; Sect 3.2	13	In the second paragraph the time frames given of "10 years or less" and "9 to 12 years" are the exact same given the actual range of construction years (except for the no action alternative). Revise to make time frames consistent.
447	Appdx L; Sect 3.2	13	The ratings given (good/fair/poor) for the Implementability Screening Metric are described as a function of overall construction time and duration of underpier dredging. However, the final ratings can be directly correlated to underpier dredging only: no underpier = good; 2 years underpier = fair; 11-12 years underpier = poor. It seems that overall construction timeframe metric was either not used, or it was heavily outweighed by underpier dredging. Clarify this in the text.